12-2010

# The State of Integrated Open Space Planning: Toward Landscape Integrity?

Lindsay Ex
*Utah State University*

# THE STATE OF INTEGRATED OPEN SPACE PLANNING:

# TOWARD LANDSCAPE INTEGRITY?

by

Lindsay Ex

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF LANDSCAPE ARCHITECTURE

Approved:

| | |
|---|---|
| _____ | _____ |
| Carlos V. Licon<br>Major Professor | Caroline M.N. Lavoie<br>Committee Member |
| _____ | _____ |
| John A. Bissonette<br>Committee Member | Byron R. Burnham<br>Dean of Graduate Studies |

UTAH STATE UNIVERSITY
Logan, Utah

2010

# ABSTRACT

The State of Integrated Open Space Planning:

Toward Landscape Integrity?

by

Lindsay A. Ex, Master of Landscape Architecture

Utah State University, 2010

Major Professor: Dr. Carlos Licon
Department: Landscape Architecture and Environmental Planning

Open space planning has been present within the United States for over a century. Traditionally, open space planning efforts tend to focus more exclusively on either socially-based (e.g., recreational, scenic, or park planning) or ecologically-based (e.g., preserves, habitat networks or more general conservation planning) planning efforts. This separation of ecological and social frameworks in open space planning is reinforced by a persistent cultural model, where community and conservation are seen as opposing forces instead of partners.

While recent open space planning efforts have begun to integrate social and ecological frameworks into one plan, the majority of our knowledge on integrated open space planning comes from individual case studies. Thus, a synthesized toolbox for how to practice this planning field is lacking. Given this lack of synthesized knowledge of integrated open space planning, an exploratory effort was undertaken to begin to view

this newer planning field through a comprehensive lens. The goal of this research was to identify the state of integrated open space planning and begin to assess whether this state was leading toward "landscape integrity," which suggests that healthy social and ecological systems must function together to be sustainable.

Framed within an adapted Pressure-State-Response framework, this thesis employed mixed methods and multiple perspectives to engender a holistic framework that identifies the pressures, state of, and potential responses surrounding integrated open space planning. Pressures synthesized from practice and theory include key barriers and facilitators to achieving integration. For the first time, the state of integrated open space planning has been identified from a synthesis of thirty planning processes, practices, and tools utilized in this new planning field. This framework provides planners with a framework upon which sharing and communication can now take place regarding how integrated open space planning can be institutionalized. Finally, this understanding of the pressures and state reveals potential responses for this newer planning field, including the need for increased collaboration to build this new field of open space planning into a mainstream planning field and increased research into bridging the gaps between theory and practice identified through this thesis.

This study found two integrated open space planning models and a breadth of literature supporting a movement away from the community versus conservation dichotomy. While this movement is not yet mainstream, both paradigm shifts and the rapidly changing landscapes in which we live are reinforcing this trend. With the expanded view and holistic framework illustrated by this research, planners are afforded

a similar language upon which they can discuss the tools and processes central to integrated open space planning.

(219 pages)

# ACKNOWLEDGMENTS

Funding for this study has been provided by the Lawrence T. Dee and Janet T. Dee Foundation and the Swaner Green Space Institute. These funders have allowed this research to not only be explored to its full potential but will also serve as the catalyst for presenting the findings at the 3rd International Fabos Conference on Landscape and Greenway Planning held in Budapest, Hungary in July of 2010.

The support from my committee in exploring these concepts and testing me to clearly explain how such findings can be conveyed has certainly made me a better professional and aware of the personal depth gained through this process. Dr. Carlos Licon is the master of graphically explaining abstract concepts and I am forever indebted to the lessons he has taught me. I am certainly the source of jealousy in all my peers for the support you have given me throughout this process. Caroline Lavoie – I asked you to be on my committee because I knew you would push me and you did not disappoint. For that I am eternally grateful. Thanks to John Bissonette for stepping out of your comfort zone and immersing yourself in the uncertainty of qualitative research – perhaps this is really where emergent properties begin to form.

Additional thanks to Dr. John Allen for his ability to take my ideas about how to assess the state of integrated open space planning and turn that into a methodology – this quality of yours is amazing and I am grateful to have benefited from it. Special thanks to Keith Christensen for questioning my aims whenever possible, and serving as the most amusing ex-officio committee member ever. To Kathy Allen, my department mom, I will be forever grateful to you for your endless support throughout my career at Utah State and what I know will be an amazing friendship from here on out.

This research effort would be sorely lacking in depth had it not been for the fourteen practitioners who subjected themselves to my questioning, sometimes on their off hours and always at the sake of their daily job requirements. I do believe that your sacrifice was worth it.

My colleagues and friends within the department – your unending feedback and reminders to stay sane were some of the greatest joys of these past three years for me. To Sarah and Colleen – you ladies are my soul food and the best friends a girl could ask for.

Thanks to my family for your unending support and your willingness to not only understand what landscape architecture is but to subject yourselves to my endless thesis discussions when your lives contained much more interesting anecdotes than mine. Finally, to my husband, Seth, who was the most wonderful reminder that there is life beyond this document. Thank you for everything – you are the reason I persevere.

Lindsay Anne Ex

# CONTENTS

Page

# LIST OF TABLES

# LIST OF FIGURES

Figure Page

## DEFINITIONS

Grounded Theory: Grounded theory is a qualitative research method developed in 1967 by sociologists Glaser and Strauss (Corbin and Strauss 1990, Glaser and Strauss 1967, Strauss and Corbin 1990). In a grounded theory perspective, it is believed actors have a choice regarding their actions and there is a process between experiences and the individuals, such that the meaning of a process or subject is always shifting. Thus, the researcher's role, according to Corbin and Strauss is to "catch this interplay" or "to not only uncover relevant conditions, but also to determine how the actors respond to changing conditions and to the consequences of their actions" (Corbin and Strauss 1990, 5).

Landscape Integrity: The concept, as espoused by Hellmund and Smith (2006), suggests landscape integrity is a function of both healthy ecological landscapes and healthy social landscapes.

Open Space: In this thesis, the term open space follows Ahern (1991, 131) in that "open space is a term used by landscape planners and landscape architects for land areas that are intentionally left unbuilt as fields and forests while the land around them is developed into buildings and pavement."

Participatory Planning: Participatory planning is the involvement of the public within decision-making processes or planning processes (see Arnstein 1969 or Reed 2008 for a full description).

Pragmatism: While many volumes are dedicated to defining pragmatism (see Dewey 1922, 1930, Baert 2005 for both traditional and more contemporary examples), this thesis uses the four tenets of pragmatism as espoused by Creswell (2003) for ease of communication: that pragmatism is concerned with the consequence of actions, is problem-centered (as opposed to method-centered), pluralistic, and real-world practice oriented (2003, 6-12).

Pressure-State-Response framework: Rapport (1979) first described the relationship between humans and the environment within a stress-response framework to allow organizations and countries to assess indicators of progress toward sustainability (Berger and Hodge 1998). Since this original conception, many organizations have included pressures within the framework, now using the term Pressure-State-Response framework (or PSR) to organize indicators of sustainability (Berry 1998). This expanded framework consists of three iterative cycles – pressure, representing human influence on the environment; state, or the current condition of the environment; and response, how society responds to the state.

Qualitative Research: Qualitative research is focused on a holistic exploration of the research topic (Creswell 2003, Denzin and Lincoln 2000). According to Creswell (2003), the basic components of qualitative research include the following: a focus on research in the natural setting of the research subjects or processes, the use of more than one research method to understand the research question, a focus on exploration rather than statistical or numerical analysis, an inherently holistic view of the research problem, the researcher

acknowledges his or her role in the inquiry, the process is both iterative and flexible, and the researcher uses a specific "strategy of inquiry" to guide the study (181-183, see also Groat and Wang 2002, Miles and Huberman 1994).

Symbolic Interactionism: An offshoot of pragmatism (see Blumer 1969 for his monograph on the perspective of Symbolic Interactionism), Symbolic Interactionism is respective of grounded theory in the following three tenets: "multiple realities exist, data reflect the researcher's and the participants' mutual constructions, and the researcher, however incompletely, enters and is affected by participants' worlds" (Charmaz 2003, 314).

Theoretical Saturation: A foundational tenet in the creation of a grounded theory is to reach theoretical saturation (Glaser and Strauss 1967, 61), where no new ideas are identified within the study to develop the grounded theory. The founders of grounded theory argue that researchers must sample multiple categories and maximize their differences to achieve theoretical saturation.

# CHAPTER I

# INTRODUCTION

*"Marrying social and environmental concerns is a major characteristic of a sustainable community"*
-Beatley 1995, p 387

Open space planning has been present within the United States for over a century (Daniels 2009). Traditionally, open space planning efforts tend to focus more exclusively on either socially-based (e.g., recreational, scenic, or park planning) or ecologically-based (e.g., preserves, habitat networks or more general conservation planning) frameworks (Maruani and Amit-Cohen 2007). This separation of ecological and social frameworks in open space planning is reinforced by a persistent cultural model, where community and conservation are seen as opposing forces and able to function separately without dependency on each other (Agrawal and Gibson 1999; Koomen, Dekkers, and van Dijk 2008).

However, recent open space planning efforts have begun to integrate social and ecological frameworks into one plan. Efforts to-date have documented how practitioners and researchers are incorporating the concepts of both frameworks, such as the incorporation of participatory planning into ecologically-based open space planning (Reed 2008; Tippett, Handley, and Ravetz 2007) or the incorporation of landscape ecology principles into more socially-based open space planning efforts (e.g., Yahner et al. 1995). Yet, the majority of our knowledge on integrated open space planning comes from individual case studies. Thus, a synthesized toolbox for how to practice this planning field is lacking.

Additionally, little is understood from a holistic (all-encompassing) perspective about the state of integrated open space planning. In other words, what tools do practitioners rely on most? What barriers are hindering planners from incorporating integrated open space planning into more plans? Given this lack of synthesized knowledge, an exploratory effort was undertaken to begin viewing this newer planning field through a more comprehensive lens. The goal of this research was to identify the current state of integrated open space planning and assess whether progress was being made toward "landscape integrity," (Hellmund and Smith 2006, 6) which suggests that healthy social and ecological systems must function together to realize the goal of sustainability.

To understand this new view of integrated open space planning, it is necessary to shift away from the community versus conservation dichotomy through an examination of the mutual pressures affecting society and landscapes. First, two key elements are discussed that serve as a guide throughout this thesis: the term "landscape integrity" (Hellmund and Smith 2006) and the Pressure-State-Response (PSR) framework (Berry 1998). Then, this introduction provides a brief exploration of the current state of open space planning within the PSR framework. The introduction concludes with an examination of the research needs of this planning field and the expected contributions this thesis will provide.

## Framing This Thesis: Landscape Integrity and the Pressure-State-Response Framework

### Landscape Integrity

The term "landscape integrity" has been espoused in the literature largely to refer to ecological systems (Hellmund and Smith 2006). However, Hellmund and Smith, in their book *Designing Greenways*, call for an updated, more inclusive interpretation of landscape integrity, specifically noting:

> …Although this term [landscape integrity] has sometimes been used with a meaning more focused on natural systems, the pairing of these two words suits the broader goal of ecological and social quality for greenways…To evaluate landscape integrity is to consider the overall quality or health of the landscape, including ecological and social functions (2006, 6).

Several professions have attempted to understand landscape integrity and how to begin to protect it– from land use planners and landscape architects (Ahern 1995, 1991; Arendt 2004; Fábos 2004; Hersperger 1994; Koomen, Dekkers, and van Dijk 2008); to conservation biologists and ecologists (Hoover and Shannon 1995; Miller et al. 2009, Miller and Hobbs 2002; Pierce et al. 2005; Soule 1991); and, finally, social scientists and recreation planners (Reed 2008; Tzolova 1995; Vaccaro and Norman 2008). While many practitioners and academics use the term sustainability instead of landscape integrity, this author is more closely aligned with Forman (2008) when he eloquently argues that, "I usually avoid the term [sustainability] as mainly being a goal reflecting each user's agenda rather than a base of knowledge, and more to the point, it feels about as solid as sitting on a chair of jello, or toothpaste" (2008, 252; see also Conroy and Berke 2004). While Forman (2008) ultimately argues that landscape ecology should be the foundation for our future, I argue the concept of landscape integrity encompasses social and

ecological processes more inclusively (see also Hellmund and Smith 2006), especially in light of the questions raised regarding landscape ecology's present inability to affect decision-making (Nassauer and Opdam 2008). However, due to the term sustainability's prevalent use within the literature, it is used throughout this thesis whenever an author or interviewee discusses the term.

## Pressure-State-Response Framework

Rapport (1979) first described the relationship between humans and the environment within a stress-response framework to allow organizations and countries to assess indicators of progress toward sustainability (Berger and Hodge 1998). Since this original conception, many organizations have included pressures within the framework, now using the term Pressure-State-Response framework (PSR) to organize indicators of sustainability (Berry 1998). This expanded framework consists of three iterative cycles – pressure, representing human influence on the environment; state, or the current condition of the environment; and response, how society responds to the state (Figure 1).

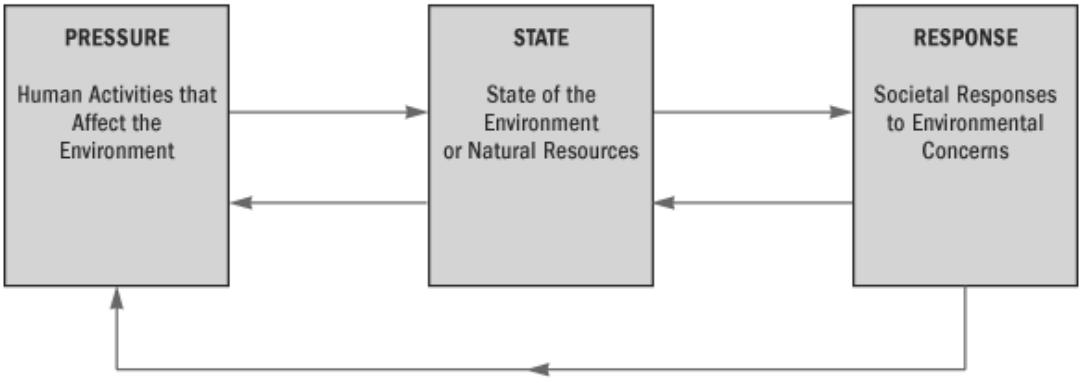



Figure 1**:** The Pressure-State-Response framework (adapted from Berry 1998). Note that while the framework flows from pressure to state to response, each frame is also connected via multiple pathways, suggesting the cyclic nature of the framework.

While the original framework has been adapted by many countries and organizations to correct for its initial, over-simplified framework, PSR is still used in countries across the globe (Berry 1998; Boothroyd and Drury 2008; Organisation for Economic Co-operation and Development 2003; Quality Planning 2009).

This thesis uses an adapted PSR framework (Figure 2) to explore the evolution and potential future directions of integrated open space planning. In this research, pressures include social and ecological forces that drive (or affect) open space planning. The state represents current innovations in open space planning, both from theoretical and practitioner standpoints. Finally, the response reveals gaps between theory and practice, and examines how the field of open space planning will need to adapt (or respond) to protect landscape integrity. As in the original PSR framework, the arrows connecting each element indicate that, while the framework itself appears linear, the causal relationships between each portion is a synergistic product that occurs across space and time.

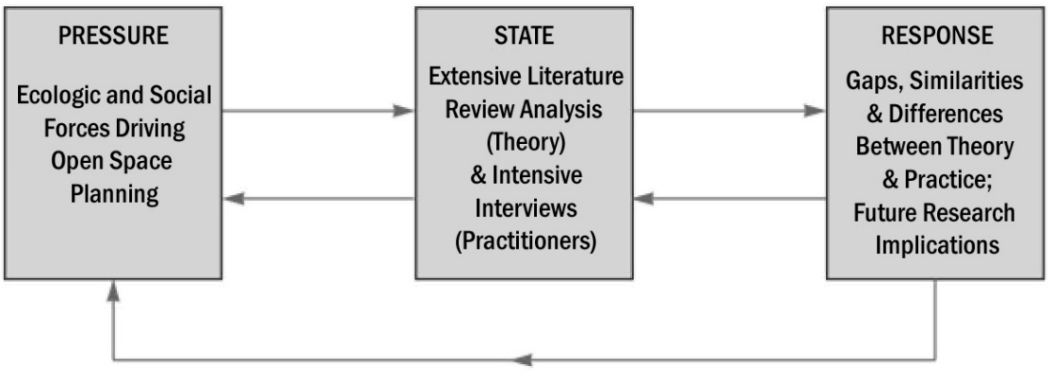



Figure 2: The Pressure-State-Response Framework in relation to this study's anticipated outcomes (adapted from Berry 1998). It is the goal of this study to uncover the ecological and social forces driving (or inhibiting) more integrated open space planning, to understand through theory and practice the state of integrated open space planning, and finally, to uncover future research needs and gaps between theory and practice.

## Changing Landscapes

The physical and ecological fabric in the United States is changing at an unprecedented rate (Marsh 1998; Odell and Knight 2001). The American Farmland Trust documented that, from 1992 – 1997, 1.2 million acres of land were lost to development every year in the United States (American Farmland Trust 2009). This open space loss results in significant fragmentation of ecosystems and habitats (Bryant 2006; Czech, Krausman, and Devers 2000; Dudgeon et al. 2006; Environmental Law Institute 2003; Fahrig 1997; Hess and Fischer 2001; Linehan, Gross, and Finn 1995). Further, fragmentation, considered as a disruption of continuity (see Lord and Norton 1990 for this discussion) has been cited as the primary threat to imperiled species in the United States (Wilcove et al. 1998).

Yet, these rapid rates of change and habitat fragmentation are a threat to more than just ecological systems – fragmentation is occurring within our social networks and communities as well (Quayle 1995). As Beatley (2004, 44) states, humans appear to have "a hardwired need for direct contact with nature and other forms of life." In a recent analysis, Matsuoka and Kaplan (2008, 14) researched sixteen years of publications within the Landscape and Urban Planning Journal and found "strong confirmation of the importance of nearby natural environment to human well-being" from a national and international perspective. Therefore, threatening landscape connectivity, via fragmentation, threatens both ecological and human systems.

How to address these threats to social and ecological systems has been the subject of research and practical attention. Researchers have called for a bridging of the social and ecological frameworks in the planning and science fields to ameliorate these

pressures (Beatley 1995; Environmental Law Institute 2003; Milder 2007; Naiman 1999; Soule 1991; Stephenson 2008). Traditionally each profession, e.g., planning from the social perspective, and conservation biology from the ecological perspective, has focused in their own area of expertise (Antrop 2007; Bryan and Crossman 2008; Fry 2001, Gallent and Shaw 2007), and rarely does integration across scales occur (Ahern 1991). This results in an ever-increasing number of narrowly focused solutions to what are inherently complex problems.

Even though each area continues to focus on their own priorities, Groves notes that, "ecologists and conservation biologists have long recognized that the vast majority of species neither occur in nor will be conserved in protected or conservation areas but instead must also be conserved in non-reserve lands," (2008, 1). Wiens builds on this knowledge to argue for a shift in the conservation perspective from science focusing only on protected areas to the recognition of the entire landscape as a mosaic of ecological opportunity (2009, 2007).

## Research Need

While this uncertainty is intimidating, there is reason for optimism. As planners do not have the luxury of waiting on perfect tools to make decisions and will forge ahead in light of imperfect knowledge (Romesburg 1981), researchers can look to practitioners to understand how decisions are being made in light of great theoretical uncertainty. From research into practitioners in action, evidence of increased public recognition of open space benefits have been found in positive responses on voter referenda for open space protection bonds and implementation tools, as well as increases in local and

regional policies supporting open space protection (Bates and Santerre 2001; Kline 2006; Kotchen and Powers 2006; Nelson, Uwasu, and Polasky 2007; Szabo 2009).

At the same time, there is abundant theoretical uncertainty surrounding the effectiveness of existing planning tools to meet the needs of our changing landscapes (James et al. 2009), especially in urban landscapes (Gordon et al. 2009). Additionally, existing conservation policies may be increasing ecological damage, such as "leapfrog development" that occurs as a result of conservation subdivisions or downzoning planning tools that may increase fragmentation (Wu 2006, 307, see also Conway and Lathrop 2005). Concerns also exist that open space planning tools create inequitable urban environments, where minorities and low-income individuals are disproportionately affected by limited access to open space (Day 2006; Hellmund and Smith 2006; Vandegrift and Yoked 2004), the amenities provided within open space (Crawford et al. 2008) and the ability to participate in some conservation planning programs, e.g., conservation easements (Merenlender et al. 2004).

In light of this uncertainty, this research examines how practitioners are implementing integrated forms of open space planning, including how decisions are made and the tradeoffs that result. A systematic review of the most recent and relevant literature to this field provides insight into how theoretical knowledge is being advanced to address these concerns. As the goal of more integrated forms of open space planning efforts are to reduce issues related to fragmentation (Benedict and McMahon 2006), it is expected that an increased depth in understanding of how these models function will allow practitioners to employ them more often, and thus, reduce the effects of fragmentation on both species and humans.

It is also clear that communities lack a wide range of successful open space planning methods that lead to successful implementation (Berke 2008; Kartez and Casto 2008; Laurian et al. 2004; Waldner 2009). Researchers have called for examining "innovative planning techniques" that increase success (Lachapelle, McCool, and Patterson 2003) and integrate ecological and social frameworks in planning models (Groves 2008). This research will identify how practitioners and the literature are integrating these open space planning fields through intensive interviews and an extensive literature review.

Finally, several researchers call for different methods to be examined across similar contexts (Reed 2008; Ryan, Fábos, and Allan 2006; Tippett, Handley, and Ravetz 2007). This research will study two of these innovative models that have been tested in multiple contexts, either in a national setting, Green Infrastructure (Benedict and McMahon 2006) or within the Intermountain West, CEDAR (Center for Green Space Design 2010). Finally, a review of a breadth of research literature is conducted to gain a holistic, or more complete, perspective on the state and potential future of open space planning.

## Research Approach

Research questions include the following:

1. What is the state of integrated open space planning?
2. What can make this integration work better?
3. What are the barriers to implementing more integrated forms of open space planning?

4. What are the differences, similarities and gaps between theory and practice in integrated open space planning?
5. What do we need to know to better understand this planning field?

To explore these questions, this thesis will analyze existing theory on open space planning to frame the research, assess the state of open space planning, and suggest how this field can move toward landscape integrity.

Chapter II of this thesis, Theoretical Lens, will serve as the frame in which to view the integrated forms of open space planning. Historical trends, the role of the planner, and recent attempts to perform more integrated forms of open space planning are discussed.

In Chapter III, Research Methods, the dominant qualitative (grounded theory) as well as the supporting quantitative (Likert scale metric) research methods are discussed, along with critical elements including the research design, data collection methods, data analysis process, and how the results are evaluated for validity, reliability, and the protection of human subjects. The use of interviews (practitioners) and a literature review (theory) is employed to achieve the goal of understanding the current state of integrated open space planning.

In Chapter IV, Findings, results from the grounded theory and Likert scale metric are illustrated and discussed. From this research effort, fourteen interviews were conducted with 1,560 coding mentions (see Definitions, page xii) resulting from the interviews. Fifty-five journal articles were reviewed, with 1,891 coding mentions resulting from the literature review. In the grounded theory, three core categories, six categories and 36 subcategories were developed, with a total of 3,451 coding mentions.

In Chapter V, Discussion – Toward a Response for Integrated Open Space Planning, the grounded theory that arose from the analysis is discussed. Key limitations, implications of the study's findings, and future research opportunities are explored.

## Research Contributions

This thesis provides researchers, planners, landscape architects, and managers with an illustration of how the open space planning field is successfully moving forward in an era of rapidly changing landscapes. It provides planners and landscape architects with a suite of applied management tools for implementing integrated open space plans. Finally, the use of two practitioner models (CEDAR and Green Infrastructure) not only highlights emerging open space planning models, but also serves to inform planners of more inclusive tools they can use in their communities to preserve both social and ecological frameworks.

# CHAPTER II

# THEORETICAL LENS – PRESSURES ON INTEGRATED OPEN SPACE PLANNING

## The Need for More Inclusive Open Space Planning

A dichotomy of community goals versus conservation goals has long been present within society (Agrawal and Gibson 1999; Koomen, Dekkers, and van Dijk 2008). However, the relationship between community and conservation (or social and ecological frameworks) is more complex (Ahern 1995; Armitage et al. 2009; Beatley 1995; Bryan and Crossman 2008; White et al. 2009). Thus, this literature review seeks to understand the complexity of this planning process, the evolution of social and ecological planning trends, and the documented responses to these trends. The literature review provides a theoretical lens (Creswell 2003) through which the interviews and literature, examined in this thesis, can be viewed and offers an initial understanding of the theoretical stage upon which open space planning practitioners perform.

In order to gain an understanding of how this inclusive concept of landscape integrity can inform the future of open space planning, this literature review covers the following areas:

- History of ecological and social trends in open space planning,
- The dominance of technical knowledge in the field of planning,
- The subsequent attempts to be more inclusive of ecological and social frameworks in planning methods, and

- The need for more inclusive open space planning models, including international and United States models that provide for an open space planning paradigm that moves toward landscape integrity.

Finally, in a section entitled "Toward a New Paradigm" the larger theoretical concepts associated with open space planning is explored. Note that within this chapter of the thesis, literature refers to all documented bodies of work (journals, books, etc.), whereas in the Findings Chapter, the term literature is focused more explicitly on the 55 articles reviewed in this study.

## History of Ecological and Social Trends in Open Space Planning

The history of open space planning shares a similar history with the history of environmental planning, as documented by Daniels (2009), see Table 1 on page 14, which describes this history through five eras. As Daniels (2009) notes, the early history of open space planning began with the creation of networks connecting various neighborhoods in urban areas through park and recreation design, e.g., the Boston "Emerald Necklace Plan," (Fábos 2004) and through the City Beautiful movement, where nature and order were brought into the city (Daniels 2009). Even though ecological benefits have been derived from these early efforts of open space protection, this early movement remained, inherently, a social construction (Schmidt 2008).

Increased national attention was brought to the conservation movement in the 1930s and culminated in several events in the 1960s that led to transformations in the way the environment was addressed at a national scale. From the Cuyahoga River catching fire, the release of Silent Spring (Carson 1962), and the book *Design with Nature* (McHarg 1969), a national environmental movement spawned. As Nash writes,

Table 1: Five eras of U.S. Environmental Planning (adapted from Daniels 2009, reprinted with permission from the Taylor and Francis Group © 2009).

| Era and Issues | Purposes | Actors |
|---|---|---|
| **Progressive era** | | |
| Urban parks, playgrounds, city beautiful | Aesthetics, social gathering place, sense of place | Frederick Law Olmsted (F.L.O.), Daniel Burnham |
| Garden cities, suburbs | Public health, sense of place | Ebenezer Howard, F.L.O. |
| Wilderness | Nature protection, sense of place | John Muir |
| Conservation of natural resources | Efficiency, sustainable yield | Gifford Pinchot |
| **Regional ecological planning & putting science in environmental planning** | | |
| Regional ecological planning | Balance nature with built environment, economy with wilderness, sense of place | Lewis Mumford, Clarence Stein, Benton MacKaye, Ian McHarg, regional commissions |
| Wilderness protection | Nature protection, sense of place | U.S. Department of Interior, Wilderness Society, National Wildlife Federation |
| Environmental impact assessment | Public health, natural resource conservation | Ian McHarg, U.S. Environmental Protection Agency (EPA), state environmental agencies, regional commissions |
| **Modern environmental planning** | | |
| Pollution cleanup and control | Public health, remediation | EPA, state environmental agencies, private sector, NGOs |
| State-level planning | Manage growth, protect natural resources | State planning offices, state environmental agencies, local governments |
| **Backlash or a bridge to sustainability?** | | |
| Regulatory flexibility, financial incentives, cooperation | Impede environmental progress, change regulations | Federal government, EPA, private sector |
| The rise of land trusts and NGOs | Preserve land, protect environmental quality | Land trusts, NGOs, Nature Conservancy, Natural Resources Defense Council, Environmental Defense, Sierra Club |
| **Sustainability and the global environment** | | |
| Sustainability | Long-term economic, environmental, and social viability, sense of place | Cities, land trusts, private sector |
| Global environment | Human prosperity, survival of living beings, maintaining global ecosystems | Al Gore, federal government, private sector |
| Urban ecological planning | Public health, sense of place, protection of city as ecosystem | Cities, land trusts, private sector |

"in the 1960s and 1970s 'environment' and 'ecology' became household words" (Nash 2001).

From an American movement to a global movement (McHarg 1992), the last forty years have seen explosion of awareness and attention paid to ecological and social concerns related to sustainability. Conroy and Berke note "the United Nation's 1992 Environment and Development Conference in Rio de Janeiro propelled the concept of sustainable development into the public consciousness" (2004, 1381). The increase in prevalence of governmental councils to address these issues can be found in prominent examples, including the Interagency Partnership for Sustainable Communities (US EPA 2010) and the United Nation's Division for Sustainable Development (United Nations 2009). Additionally, private sector initiatives are growing to address these needs including the federal ENERGY STAR program (Cytron 2008), Leadership in Energy and Environmental Design (Cytron 2008) and the Sustainable Sites Initiative (SITES 2008), such that everything these days seems to "going green" (Cytron 2008, 3).

## Open Space Typologies

To bring this discussion closer to the field of open space planning, two typologies have been developed that are pertinent to this research. In his widely praised text, Randolph (2003) developed a typology suggesting open space planning has become increasingly complex with time (Figure 3). In Randolph's typology, open space planning has evolved from a discrete focus on parks and recreation planning to a newer, open space planning concept entitled green infrastructure. While Randolph's classification is simple and additive, it neglects the notion that open space planning for conservation has been in existence prior to the 1990s as discussed in the previous section.

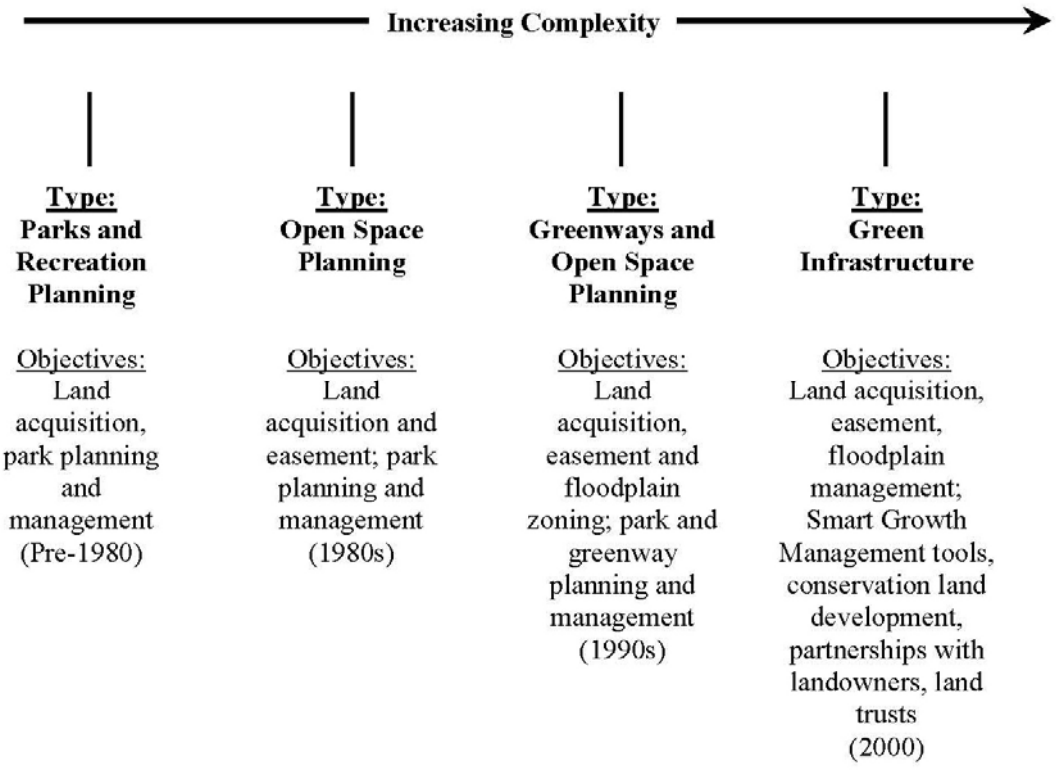



Figure 3: Typological View of Open Space Planning (adapted from Randolph 2003)

A second typology, advanced by Maruani and Amit-Cohen (Figure 4), suggests open space planning can be categorized within two overarching paradigms, "provision of recreation and other services to society *and* conservation of natural values," (2007, 2 emphasis added). Instead of the planning's variability based on a function of time, as in Randolph's framework, this typology suggests the planning effort's focus drives the focus and extent of the open space plan. These frameworks highlight the dichotomy of community versus conservation, in that open space planning has typically been handled in one of two ways – either to protect open space from a recreational (social) paradigm or a conservation (ecological) perspective.

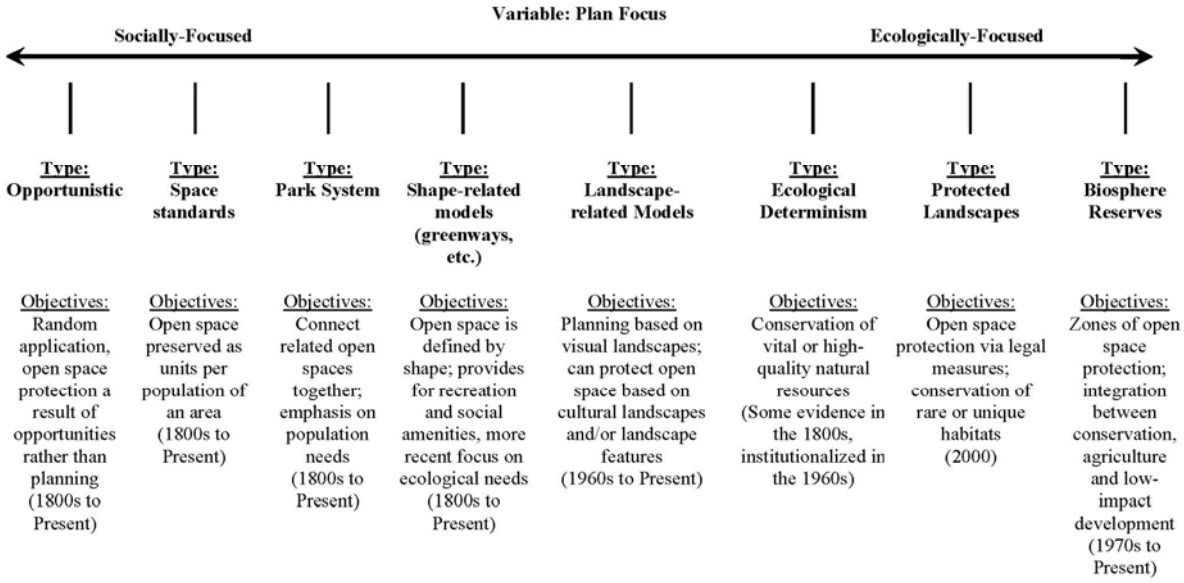



Figure 4: Typological View of Open Space Planning (adapted from Maruani and Amit-Cohen 2007).

Yet, not all open space planning efforts follow these typologies. Several open space planners have sought to merge social and ecological frameworks under a single plan (Arendt 2004; Hoover and Shannon 1995; Hostetler and Drake 2009; Steelman and Hess 2009). These integrated open space planning efforts are in tandem with the global movement of sustainability and the creation of landscape integrity. Thus, a trend is emerging that incorporates both social and ecological frameworks into a single open space plan, but much work remains to be done. To gain a broader understanding of how much work remains, the field of open space planning needs to be understood within its larger context: the field of planning, which has traditionally emphasized the importance of technical knowledge in the planning process (Friedman 1987).

## The Dominance of Technical Knowledge in the Field of Planning

Though many alternatives have been presented and bring other values, e.g., participatory planning, to planning practice (Davidoff 1965; Healey 1996; Innes 1995), the rational planning model continues to dominate practice today (Harper and Stein 2006; Hudson, Galloway, and Kaufman 1979; Lachapelle, McCool, and Patterson 2003, Stephenson 2008). The rational model was born out of the Enlightenment period, when reason became equated with knowledge. The rational model has many other names, including the positivist theory (Naveh 2001, 2007), synoptic planning (Hudson, Galloway, and Kaufman 1979; Lachapelle, McCool, and Patterson 2003), the heroic model of planning (Sandercock 1998a, 1998b) and the public policy tradition (Friedmann 1987). Yet, regardless what name is attributed to the rational model, the basis of the model is a scientific, rational method that can be duplicated (Sandercock 1998a).

Within this model, the planner plays the role of the "technocrat," serving the public with rational knowledge, such as where the poor soils are, and determining the best alternatives for a community without placing her own values into the process (Friedmann 1987, 79). An important component of the rational model is to set the goal first, with an end in mind, so the planning process is a means toward achieving the end goal (Harper and Stein 2006).

### Effects of the Rational Planning Model On Open Space Planning

This dominance of technical knowledge in the field of planning has influenced its specialty field of open space planning. From an ecological perspective, the rational model has influenced open space planning in its incorporation of technical, scientific knowledge

into the overlay method made popular by Ian McHarg and his seminal work *Design with Nature* published in 1969. The popularization of this technical form of open space planning has been highlighted in Crewe and Forsyth's LandSCAPES typology as the Landscape Analysis section of their typology (2003), where they describe this component of landscape architectural practice as large-scale, ecological planning. Also known as suitability analyses or landscape suitability analyses, Ndubisi argues the overlay method may have become the most popular form of ecological planning (2002). Certainly the rise in use of Geographic Information Systems (GIS) in the planning field has reinforced this popularity (Drummond and French 2008).

From a social perspective, the dominance of technical standards to drive open space planning has been as prevalent. The National Park and Recreation Standards (Lancaster 1990) provide guidance to recreational planners on placement of their parks in a community based on spatial characteristics, and the U.S. Forest Service (Clark and Stankey 1979) maps its recreational opportunities through a Recreation Opportunity Spectrum, where trail designs are based on the site's context, e.g., a 6-8' trail width for an urban trail. Though these efforts allow for public comment and other methods of voicing public opinion, technical planning efforts dominate the field today (Harper and Stein 2006; Hudson, Galloway, and Kaufman 1979; Lachapelle, McCool, and Patterson 2003; Stephenson 2008).

### The Subsequent Attempts to Be More Inclusive in Planning Methods

Yet, the increasing demand to move beyond technical solutions to address "wicked and messy" (Lachapelle, McCool, and Patterson 2003; Rittel and Webber 1973) problems has invaded the field of planning. These demands began as early as fifty years

ago, when Arnstein published her ground-breaking work entitled "A Ladder of Citizen Participation" (1969), where she challenged the planning profession to acknowledge that all forms of planning are not equal and that citizens need to have power in the planning process in order for meaningful participation, and more inclusive decision-making, to take place. Beyond public participation, Sandercock argues the demand for addressing these complex problems was a "crisis of democracy itself" (2005, 437) in that place-making is a process that belongs to all people and not just the planning profession. Thus, more inclusive forms of knowledge and collaborative processes in the planning process have taken rise (Chase, Decker, and Lauber 2004; Chess and Purcell 1999; Innes and Booher 2004; Reed 2008). Within the field of open space planning, attempts to respond to these complex problems have come from both the ecological and social frameworks of the open space planning sector (Table 2).

## Incorporation of Social Elements into Ecologically-Based Open Space Planning

From an ecological perspective, the main method of integrating social and ecological frameworks has been the incorporation of participatory planning into ecologically-based open space planning. First written about in 1969, and as noted above, Arnstein explored the incorporation of participation into the planning field, comparing the levels of participation that communities offer its citizen as an analogy to the rungs of a ladder. Davidson (1998) updated the notion of Arnstein's ladder into a wheel, suggesting there are many valid versions of public participation and that each planning situation can require different forms of participation.

Table 2: Summary of the studies illustrated in this literature review that have sought to cross their dominant Open Space Planning Paradigm.

| **Dominant Open Space Paradigm** | |
|---|---|
| **Ecological** | |
| Integration Tool: Public Participation | |
| Balram and Dragićević 2006 | Day 1997 |
| Balram, Dragićević, and Meredith 2004 | Department of City and Regional Planning Workshop, Cornell University 2007 |
| Brandon et al. 2005 | George, Nelson, and Winkler 2009 |
| Brody 2003 | Hoover and Shannon 1995 |
| Bryant 2006 | Reed 2008 |
| Carton and Thiessen 2009 | Shandas and Messer 2008 |
| Chase, Decker, and Lauber 2004 | |
| Chess and Purcell 1999 | |
| **Social** | |
| Integration Tool: Incorporating Ecological Principles and Processes | |
| Abella, Jaeger, and Schetter 2007 | Kartez and Casto 2008 |
| Cowling, Pierce, and Sandwith 2002 | Pierce et al. 2005 |
| Ewan, Fish Ewan, and Burke 2004 | Tzolova 1995 |
| **Integrated** | |
| Integration Tools: Flexible Institutions, Systems Thinking | |
| Brunckhorst, Coop, and Reeve | Ling, Hanna, and Dale 2009 |
| Cowling, Pierce, and Sandwith 2002 | Shandas and Messer 2008 |

Many researchers have theorized better ways to incorporate participatory planning into ecologically-based open space planning (see, for example, Brody 2003; Bryant 2006; Chase, Decker, and Lauber 2004; Chess and Purcell 1999; Day 1997; Reed 2008). Most recently, Reed (2008) has developed a suite of Best Management Practices for incorporating stakeholder participation into environmental management schemes.

The field of practice has been no less diligent in exploring methods to incorporate participatory planning frameworks, as researchers have documented. Hoover and

Shannon (1995) review greenway efforts in the Tug Hill region of upstate New York that used participatory planning methods to accomplish open space conservation goals. In their study, the authors acknowledged that traditional forms of interaction between planners/authorities and citizens had been formal, where the planners are the experts and citizens had less valued opinions. In participatory planning, citizens can come to have a larger role in the planning process, with the ability ultimately to shape and create public policy.

Shandas and Messer (2008) reviewed the involvement of the public in community-based watershed stewardship programs in the Portland area and suggested that participatory planning in an ecological framework occurs in a positive feedback loop: citizens increase their levels of trust in government, then government increases the level of citizen engagement and as a result, ecological restoration and protection increasingly occur.

Social frameworks for open space planning are also being incorporated into landscape suitability analyses, through both the forms of collaborative mapping (Balram and Dragicevic 2006; Balram, Dragićević, and Meredith 2004; Carton and Thissen 2009) and through the weighting of suitability analyses to respond to community preferences or strategic goals (see, for example, Brandon et al. 2005; Department of City and Regional Planning Workshop - Cornell University 2007; George, Nelson, and Winkler 2009; Miller et al. 1998).

Finally, one of the most comprehensive reviews on the partnership between ecologically-based open space planning and participatory planning was completed in England by Tippett, Handley, and Ravetz (2007). The authors reviewed the ability of

fifteen, ecologically-based or participatory-based, planning models to whether these models met the challenges of sustainable development (such as the ability of a planning process to "engage meaningful participation with community members and stakeholders (Tippett, Handley, and Ravetz 2007, 35). The authors found that while participatory methods may be better at accomplishing social goals, ecological planning methods were more likely to achieve conservation goals. To help bridge this gap, and meet all of the challenges of sustainable development, the authors created *DesignWays*, a method of open space planning containing a strong participatory component and which places ecological and social decisions into a systems-based perspective.

## Incorporation of Ecological Elements into Socially-Based Open Space Planning

From a social perspective, the incorporation of ecological elements into open space planning comes from many authors. First, planners are beginning to incorporate scientific knowledge into their open space and comprehensive planning efforts. For example, Kartez and Casto (2008) examine a case study in Maine where a suite of agencies have provided local governments with critical habitat information while these local governments were updating their comprehensive plans. The authors note that information is provided by ecological professionals to the communities who are conducting the planning. While there is an outreach process to explain the information given to the communities, it does not appear that the communities have the ability to modify this information to include local knowledge.

Within the Phoenix metropolitan area, Ewan, Ewan and Burke (2004, 70) examine how the Sonoran Preserve Master Plan incorporated landscape ecology terms, including patches, corridors, and ecological networks, as "justification for the

configuration of the preserve." In Northwest Ohio, a system of Metro Parks has incorporated GAP analysis (or Geographical Approach to Protection of biodiversity, see Scott et al. 1993) as a guide for prioritizing critical habitats and protection efforts within distinct preserve areas in the parks (Abella, Jaeger, and Schetter 2007). Also, Yahner et al. (1995) have illustrated methods to integrate landscape ecology principles, e.g., enhancement of biological diversity and fragmentation reduction, into a section of the Appalachian Trail that is dominated by social factors, including the area's extensive and the recreational nature of the trail itself.

Two international examples highlight the incorporation of ecology into socially-based open space planning efforts. In Bulgaria, Tzolova (1995) illustrated how the Danube River greenway, which was designed largely to meet recreational needs, but also incorporated floodplain protection and the identification of critical habitat areas. In Africa, Pierce et al. (2005) worked with local governments and stakeholders to incorporate conservation planning tools into their decision-making processes. This effort not only developed an extensive mapping system of corridors that crossed political boundaries, but then the authors interpreted the map for municipal-level decision makers in the form of guidelines for map use and a handbook which delved into the value of the map and policy implications. Each of these national and international examples serves as an illustration of the increasing incorporation of ecological principles into socially-based open space planning.

## Integrated Open Space Planning – Flexibility and Systems Thinking

One area which both socially- and ecologically-based open space planning methods have attempted to be more integrative is through the adaptation and creation of

more flexible institutions and the use of systems thinking in open space planning and cross-scale politics. In their analysis, Agrawal and Gibson (1999) suggest a movement away from the elusive term of community in open space planning and, instead, to employ the term institutions. Toward this end, several researchers have sought to form new institutions to address open space planning needs. Specific attempts to incorporate ecological principles include the use of watershed councils (Shandas and Messer 2008) and the development of regional councils better adapted to address larger scale-ecological needs (Brunckhorst, Coop, and Reeve 2006; Cowling, Pierce, and Sandwith 2002).

In a study from Canada, Ling, Hanna, and Dale (2009, 228) created a template for Canada's "Integrated Community Sustainability Plan" including ecological principles, participatory planning, and urban form considerations. This integration across planning fields is an excellent example of systems thinking in open space planning

In a synthesis of eleven case studies of conservation planning in Africa, Cowling, Pierce, and Sandwith (2002, 143) found four prerequisites to mainstreaming biodiversity: "(1) scientific knowledge and understanding, (2) adequate institutional capacity, (3) effective NGO involvement, and (4) commitment of stakeholders. These four prerequisites go to the heart of the need for integrated open space planning: both ecological (scientific knowledge) and social (institutional capacity and stakeholder involvement) are critical elements of any integrated open space plan.

In summary, while the incorporation of ecological and social frameworks into open space planning is far from complete, it is clear many researchers and practitioners are heading in this direction. Additionally, both ecological professionals and social

scientists have recognized that tradeoffs, or what Groves (2008, 83) calls "muddy boots conservation," must occur if sustainability is to be achieved (Czech, Krausman, and Devers 2000; Dudgeon et al. 2006; Pulliam and Johnson 2002; Risser 1999; Wiens 2007, 2009). Thus, clear advantages have been identified for integrating social and ecological frameworks into open space planning.

## Arguments against Integrated Forms Of Open Space Planning

Yet, not all of the literature suggests merging social and ecological frameworks will result in such clear benefits, even within some of the studies noted above. From the perspective of incorporating public participation, Ryan, Fábos, and Allan (2006) conducted a systematic review of collaborative greenway planning efforts in New England; the authors discovered four key strategies that led to greenway plan implementation. Yet, instead of involving the public in the planning process as a key strategy, the researchers found that public participation was viewed as necessary to gain political support or as labor during project implementation.

Additionally, Brody (2003, 412) stated "simply having a wide range of participants present in the planning process does not guarantee higher quality plans." Brody noted that industry representatives, ranging from utility companies to land developers, are often overlooked as stakeholders in the planning process, but actually are the stakeholder group that has the greatest ability to increase plan quality. Shandas and Messer (2008) also note the importance of involving community members representing a diversity of viewpoints, and not just the public at large, into the planning process (see also Reed 2008). This research suggests the presence of conflicting viewpoints on the

role the public should play as well as which stakeholders to involve in open space conservation.

Beyond incorporating the social frameworks into an integrated form of open space planning, examples of conflicting perspectives exist in the ecological, economic, and regional planning arenas. First, many ecologists have suggested the tradeoffs, including species loss or habitat degradation, may be too great in some cases to warrant a merging of ecological and social frameworks (Agrawal and Gibson 1999; Dudgeon et al. 2006). In addition to ecologists, some social advocates have suggested there is a lack of market demand for integrated forms of open space planning, specifically in the use of conservation subdivisions or other development tools (Bowman and Thompson 2009). Finally, several authors argue that existing institutions are too inflexible and unsupportive to address the complex problems faced today (Antrop 2007; Kato and Ahern 2008).

## Toward a New Paradigm

Two options are available in light of this uncertainty: give up or keep trying. As Sandercock (2005, 441) notes in her discussion on how we can increase the democratization of public decision-making, "the democratization of planning remains elusive, fraught and flawed, yet surely worth the struggle." This acknowledgment extends into the open space planning field as well. Thus, in light of great uncertainty and rapidly changing landscapes, this research examines how practitioners and the literature are addressing these conflicts in hopes of reducing the struggle.

During a recent symposium in Eger, Hungary, over 40 researchers, practitioners and government agencies came together to discuss a new agenda for urban green space (open space) studies (James et al. 2009). The results of this symposium created two main

products, a research framework and a catalogue of key research questions. Of their 35 key questions, the 8th question is most appropriate to this study, "How can urban green spaces be designed and managed and provide access to experience nature for the urban population and still meet national and regional biodiversity targets?" (James et al. 2009, 70). In other words, how can open space planning meet both social and ecological needs? While several authors, as discussed above, have addressed these issues on a case study basis (or in a more holistic perspective as in the example from South Africa), a more holistic perspective for how integrated open space planning is performed in the United States is lacking. This research is intended to serve as a beginning answer to both the question asked above and the need for an integrated open space planning in the form of an integrated open space planning paradigm in which this newer planning field can move forward in an era of sustainability.

# CHAPTER III

# RESEARCH METHODS

This research study seeks to fuse existing efforts toward integrated open space planning into a single, comprehensive framework. This integrative perspective is best explored through a grounded theory analysis, where, due to the lack of synthesizing research into more integrated forms of open space planning, the research is focused on uncovering how practice and theory are functioning within this planning field. Charmaz (2000) suggests the juxtaposition of academic notions with those of practitioners can amplify the latent power of the proposed grounded theory. Thus, this research study has focused on harnessing this power by using a combination of an extensive literature review and intensive interviews with the selected models' practitioners (CEDAR and Green Infrastructure) to develop the grounded theory.

To accomplish this goal, the methodology is described in four stages:

1. Invention – Research Design,
2. Discovery – Data Collection,
3. Interpretation – Analysis, and
4. Explanation – Documentation and Evaluation.

These four stages are based on Kirk and Miller's (1986) four stages of qualitative analysis; though, unlike their original assessment, these four stages will be seen as iterative and dynamic (Figure 5), as per more recent qualitative research design recommendations (Creswell 2003; Groat and Wang 2002).

## Stage One: Invention – Research Design

This research design includes the documentation of the bounding of the study, the dominant research paradigm in which the study is proposed, the structured sampling

design and analysis, how objectivity will be achieved, and how the protection of human subjects will occur (Creswell 2003).

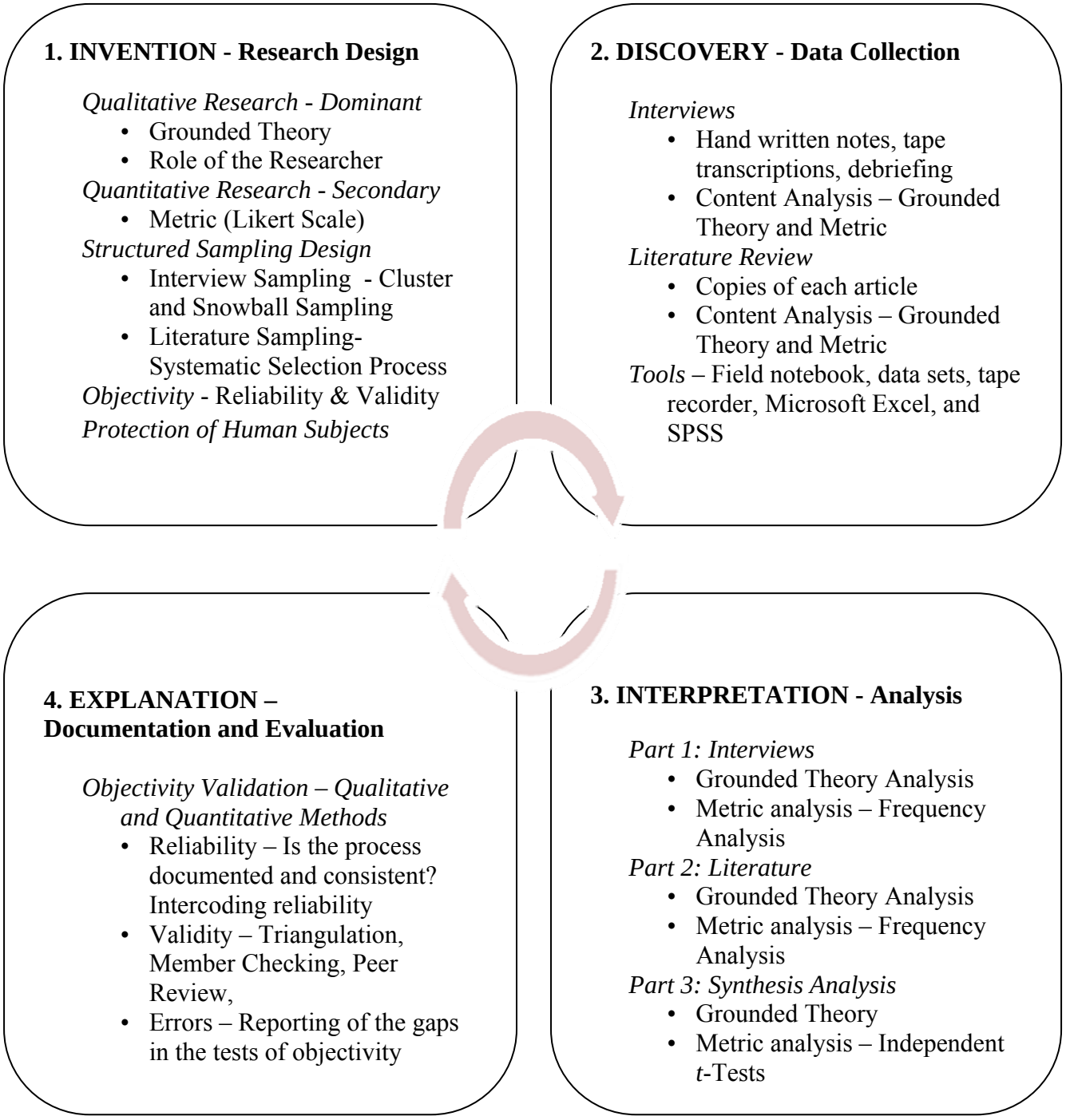



Figure 5: The proposed methodology structure for this thesis, focused on the four phases of qualitative research as discussed by Kirk and Miller (1986).

## Bounding of the Study – Setting and Models

Miles and Huberman (1994) suggest bounding a study in four ways: the setting of the study, actors (models in this case), events, and processes (see also Creswell 2003). While the setting of the study and actors (models and the literature in this case) are discussed below, events (data collection and analysis) and processes (questions) are covered in the next three sections of this methodology.

### Setting of the Study

The study focuses on integrated open space models within the Western United States, specifically Green Infrastructure (Benedict and McMahon 2002) and the CEDAR method, whose acronym stands for the open space planning types uncovered in the analysis process – cultural, environmental, developmental, agricultural, and recreational (Center for Green Space Design 2010). The study emphasizes the community level, where a large amount of land use decisions are made (Agrawal and Gibson 1999; Arendt 2004; Miller and Hobbs 2002; Pierce et al. 2005). More specifically, this study focuses on western communities because of the large land to population ratios typically found in the western United States (as characterized by Theobald (2001) in his view of development patterns), which has the potential to manifest into an increased likelihood that ecological functions can be preserved within communities. Due to this limited geographic scope of the interviews, only articles that covered research or practice within the United States are reviewed within the literature review process.

**Planning Models and the Literature**

This thesis analyzes two emerging American models that seek to create a bridge between planning for humans and planning for conservation: Green Infrastructure and CEDAR. Green Infrastructure was first conceptualized by Edward T. McMahon "in a May 1999 report to the President's Council of the United States," (Hoellen 2009, 4); the model is driven by ecological concerns and seeks to unify a community's ecological and social networks (green infrastructure) under one plan. The second model, CEDAR is driven by social concerns and incorporates ecological networks into its open space planning efforts.

While Green Infrastructure is a nationally-accepted model in the professional world (Randolph 2003), the CEDAR model has been developed in Utah and tested only in one adjacent state (LeBrasseur personal communication 2009). Contrasting these models provides a unique position from which to view the integration of ecological and social frameworks in open space planning.

The literature review focuses on adding both breadth and depth to this research study through additional data (coding mentions) and through an additional dimension (theory). Primary literature will be selected from a broad range of peer-reviewed journals, including perspectives from the social, ecological, and interdisciplinary fields. It is intended that this breadth of perspectives will complement the interviews and help to understand the relationship between theory and practice, thus leading to a grounded theory (Glaser and Strauss 1967).

## Dominant Research Paradigm – Qualitative Research and Grounded Theory

Qualitative research is focused on a holistic exploration of the research topic (Creswell 2003; Denzin and Lincoln 2000). According to Creswell (2003), the basic components of qualitative research include the following: a focus on research in the natural setting of the research subjects or processes, the use of more than one research method to understand the research question, a focus on exploration rather than statistical or numerical analysis, an inherently holistic view of the research problem, an acknowledgement of the researcher's role, an iterative and flexible process, and the use of a specific "strategy of inquiry" to guide the study (181-183; see also Groat and Wang 2002; Miles and Huberman 1994).

Beyond this litany of qualitative research elements, a critical point is that data analysis and data collection occur simultaneously. More specifically, Miles and Huberman (1994) suggest that data reduction, data display, and conclusion drawing are all components of data analysis within qualitative research. Thus, the focus on qualitative research is a synthesized perspective on the research topic, which evolves as the research is undertaken.

### Grounded Theory as a Strategy for Analyzing Open Space Planning

As a strategy of inquiry, grounded theory analysis was born of the modernist period in 1967 by sociologists Glaser and Strauss (Corbin and Strauss 1990; Glaser and Strauss 1967; Strauss and Corbin 1990). While grounded theory is a strategy typically used in the social and behavioral sciences (Strauss and Corbin 1990), the strategy is increasingly being adopted in the fields of planning and designs, as indicated by its recent

inclusion into *Architectural Research Methods* (Groat and Wang 2002), a text designed to expose design students to research methods.

As Corbin and Strauss (1990) have noted, the grounded theory discipline originates in the perspectives of Pragmatism and Symbolic Interactionism (see definitions, page xiii) which leads to two critical foundations of grounded theory: the process of change and the rejection of determinism as well as nondeterminism (see also Clarke 2003). In other words, in a grounded theory perspective, it is believed actors have choice regarding their actions (the rejection) and that there is a process between experiences and the individuals, such that the meaning of a process or subject is always shifting (the change). Thus, the researcher's role, according to Corbin and Strauss is to "catch this interplay" or "to not only uncover relevant conditions, but also to determine how the actors respond to changing conditions and to the consequences of their actions" (Corbin and Strauss 1990, 5).

One foundational tenet in the creation of a grounded theory is to reach "theoretical saturation" (Glaser and Strauss 1967, 61). These founding authors state that theoretical saturation "means that no additional data are being found whereby the sociologist can develop properties of the category" (61). Further, they state, "saturation can never be attained by studying one incident in one group" (62). These authors argue researchers must sample multiple categories and maximize their differences to achieve theoretical saturation. Thus, in this study, the use of a supporting research paradigm (the Likert scale metric) and the use of multiple data sources has been employed (practitioner interviews and the literature from a breadth of journals) to achieve theoretical saturation.

Grounded theory is an appropriate strategy of inquiry for this research because the focus is to assess and construct theoretical concepts relating how each of these planning efforts, including theoretical and practical efforts, is achieving the concept of landscape integrity. Thus, as grounded theory asks the fundamental questions, "what is happening and what are people doing?" (Charmaz 2000, 514), this study seeks to understand how this integration is occurring, how the social and ecological frameworks are incorporated into open space planning and if this relationship can be improved.

## Role of the Researcher

As noted above, the researcher's role is to "catch the interplay" (Corbin and Strauss 1990, 5) between the changing environments of open space planning and how the planning models and their practitioners are responding to this changing environment. While it would be convenient to assume this research attempt can be objective and unbiased, qualitative research tenets recognize otherwise (Creswell 2003; Miles and Huberman 1994). Further, as qualitative research is "filter[ed]…through a personal lens that is situated in a specific sociopolitical and historical moment" (Creswell 2003, 182), it is important to provide a sense of disclosure of past experiences and perspectives the researcher brings to the study.

My perceptions of integrated open space planning are shaped by an undergraduate degree in Natural Resources Management focused on public policy, where I recognized the inherent link between a particular environmental setting and human actions, where the environment and social settings respond to this interplay. Additionally, due to previous work experiences in greenway development and my experiences and education above, I do bring certain biases to the study. While every effort will be made to achieve

objectivity through the initial structure of interviews to a consistent review of the methods and verification process (see section on strategies for verification of findings), these biases still may inform the results of this study. A further reflection on potential effect of my personal biases is included within the discussion chapter of the thesis (page 153), in an effort to provide full disclosure for the validity of the research results and conclusions.

**Secondary Research Method – Quantitative**
**Research Application of Metric**

Triangulation is the use of more than one research method to reduce subjectivity in qualitative research and "reflects an attempt to secure an in-depth understanding of the phenomena in question" (Denzin and Lincoln 2000, 5; see also Charmaz 2003; Creswell 2003). In this study, in addition to the grounded theory research (and to achieve theoretical saturation as discussed above), a 5-point Likert scale (Likert 1932) is employed in this study and, for each coding mention, priorities are assigned during the interviews or in the literature review (Allen personal communication 2009, Porreca 2005). In other words, the Likert scale metric identifies the strength of support the respondents give to a specific idea. This scoring process was implemented by highlighting words that indicate the author's belief on the importance of a specific topic, e.g., the use of "must" or "should" versus the use of "would like to" or "might" (following the rating examples within Miles and Huberman 1994). The use of the Likert scale measurement allows for a second perspective on the data to be gained. At the same time, though, the dominant research paradigm (grounded theory) remains qualitative in nature.

## Structured Sampling Design

The interviews and literature review are used to achieve this research project's goal of understanding how integrated forms of open space planning should (theoretically) and do (practically) function. The structured sampling design consists of three components: how samples will be selected, the number of samples, how saturation will be determined.

### Interview Sampling Design

For the interviews, initial sample selection (n = 8) used a cluster sampling technique (Bailey 1982, Gall, Gall, and Borg 2003), where participants were selected based on their active involvement with either the CEDAR or Green Infrastructure models. Practitioners of the CEDAR model were identified via the Center for Green Space Design's website (where the CEDAR method has been developed); practitioners of the Green Infrastructure (GI) model were identified via the main GI website, www.greeninfrastructure.net. Practitioner selection focused on individuals who had completed open space planning projects in the Western United States within the last five years. This timeframe was chosen because the development of integrated open space planning has a more recent history than other, more segregated forms of open space planning (see Maruani and Amit-Cohen 2007 and argument developed in the introduction and literature review of this thesis).

To achieve theoretical (or content) saturation, a second stage of interview sampling was conducted using the snowball sampling technique (Bailey 1982; Gall, Gall, and Borg 2003), where additional participants were identified in the initial interviews via questions such as, "who else does what you do?" As discussed above (page 33),

saturation was achieved when no new ideas (redundancy) were presented in the interviews (Gall, Gall, and Borg 2003; Glaser and Strauss 1967; Johnson 2002; Noerager Stern 2007).

Out of 17 possible participants in this study, 14 agreed to be interviewed (82.4% response rate). Participants who were not interviewed were either unavailable or non-responsive to requests. Five practitioners of the CEDAR model were interviewed and nine practitioners of the Green Infrastructure Model were interviewed during the time period from November 2009 to January 2010. All interviews were tape recorded and transcribed verbatim, as this was the researcher's first grounded theory analysis (see McCracken 1988 for this discussion).

**Literature Review Sampling Design**

A systematic literature review was developed for selecting the journal articles within this literature analysis. This process entailed four phases: journal selection, article search, article screening, and article selection (Table 3). In the first phase of journal selection, journals were selected in an attempt to explore the breadth of the integrated open space planning field, or what Glaser and Strauss (1967) call saturating "categories by maximizing differences among groups" (1967, 62). Journal selection was based on relevance to the field of environmental planning using the classifications developed by Gobster, Nassauer, and Nadenicek (2010). Eighteen journals were selected as a result of the first phase of the literature search (Table 4).

In the second phase, article search, two criteria were employed: (1) a Boolean code search based on keywords, and (2) limiting of articles based on the most recent

Table 3: Phases and Processes used to select articles for the literature review.

| Phase | Process |
|---|---|
| **Phase 1: Journal Selection** | **Goal:** Select journals based on the breadth of the field.<br>**Process:** Using Gobster, Nassauer, and Nadenicek (2010), select a range of journals that includes focuses on ecology, environment, environmental psychology, health, interdisciplinary, and planning.<br>**Outcome:** 18 Journals selected for inclusion in the search. |
| **Phase 2: Article Search** | **Goal:** Select articles that are relevant to the results of the interview process and reflect the most recent research.<br>**Process:**<br>• Develop a Boolean code based on keywords from the topic areas in the research to select articles from the 18 journals,<br>• Include articles within the past 10 years of research (2000-2009).<br>**Outcome:** 18 journals and 1338 articles met these search criteria. |
| **Phase 3: Article Screening** | **Goal:** Screen articles from Phase 2 to identify most appropriate articles to review.<br>**Process:**<br>• Exclude articles that lacked a degree of influence (0 citations/year),<br>• Review the full text of articles and exclude articles that only contained search terms within the references or acknowledgements, only used the main search terms as a physical description and when the main search terms were only used as a modeling criteria (see text for examples),<br>• Select articles whose research was conducted in the United States,<br>• Select articles from journals that have a minimum of ten articles that meet the search criteria (ensuring relevancy), and<br>• Record up to 25 articles in a spreadsheet from the selected journals (articles from journals where $10 \geq n$),<br>**Outcome:** 11 journals and 220 articles met these search criteria. |
| **Phase 4: Article Selection** | **Goal:** Select the articles with the most relevance and degree of influence.<br>**Process:**<br>• From these articles ($n \leq 25$), sort the articles by degree of influence (number of citations/per year), and<br>• Select the top five articles from each of the remaining journals.<br>**Outcome:** 11 journals and 55 articles met these search criteria. |

Table 4: Journal Classification Type (adapted from Gobster, Nassauer, and Nadenicek 2010) and journals included for review within this study (journals that met the final assessment criteria are highlighted in italics).

| **Journal Classification Type** | **Journal Name** |
|---|---|
| Ecology | *Conservation Biology, Ecological Applications, Landscape Ecology* |
| Environmental Psychology | Environment and Behavior, *Journal of Environmental Psychology* |
| Health | *Health and Place* |
| Geography | Environment and Planning A |
| Interdisciplinary Environmental | *Environmental Management, Journal of Environmental Management, Landscape and Urban Planning*, Society and Natural Resources, Urban Forestry and Urban Greening |
| Landscape Design | Landscape Journal, Landscape Research |
| Leisure | Journal of Leisure Research |
| Planning | *Journal of the American Planning Association, Journal of Planning Education and Research, Journal of Planning Literature* |

research. As the literature review phase of this research effort followed the interviews, the thirty-six subcategories that arose from the interview coding process (Chapter IV - Findings) were used to develop the keywords (Table 5). This was consistent with the theoretical saturation concepts associated with grounded theory, as the concepts that arose within the interviews were further probed through the literature in order to "discover categories and their properties, and to suggest the interrelationships into a theory" (Glaser and Strauss 1967, 62). In this keyword search, a two- level search was employed, where any term listed as a main search term, e.g., open space, and a term from

| Theory | Keywords |
|---|---|
| **Main Search Term** | Open space, greenway, green infrastructure or green space |
| **Topic Areas** | Engage, system, holistic, quality of life, paradigm, connectivity, value, assets, typology, names, planning, active, vision, community, stakeholders, diverse, inclusive, collaborative, process, power, public, relationships, champion, guidance, timing, willingness, analysis, context, regionalism, framework, implementation, ecology, landscape, richness, economic, science, scale, transparent, adapt, change, human, goals, focus, persevere, planner, priorities, decision, disconnect, policies, loss, luxury, reactive |

Table 5: Keywords used in the literature search. Articles were searched in such a manner that at least one term from the core Area of Interest and from the topic Areas must be included within any article (but see exclusions discussed within the text).

the topic area, e.g., participation must be included for an article to be retrieved through the search process. The second criterion, limiting articles based on the most recent research, was established by limiting articles that were published in the last ten years (2000-2009). Eighteen journals and 1338 articles resulted from the article search phase.

In the third phase of the literature selection process, article screening, five criteria were used to screen the articles for relevancy, influence and appropriateness: (1) exclusion of articles that lacked a degree of influence (2) a review of the full text of each article to ensure the intent of the Boolean code was met, (3) articles whose research was conducted outside of the United States were excluded, (4) limiting of journals based on the breadth of articles retrieved from the Boolean code search, and (5) the first twenty-five articles that met the above screening criteria were recorded.

First, any article lacking a degree of influence (e.g., zero citations) was excluded from the study. For consistency, all article citations were determined through the use of Scopus (2010), an online citation database. Second, each article's full text was reviewed

to ensure the intent of the Boolean code was met in the journal search. Exclusions for including an article that did meet the Boolean code parameters are as follows:

1. The main search terms (open space, greenway, green infrastructure, or green space) were included only within the reference section of the article, e.g., a cited article had open space in their title, or in the acknowledgements, i.e. thanking someone in an open space department;
2. The main search terms were referred to as a physical description, e.g., "This, in turn, affects those riparian species that readily colonize gravel bars or other open space near the stream banks that are usually scoured by high flow events" (Elderd 2003, 1623); or
3. When the main search terms were used only in the analysis section of a paper to set up a GIS or analysis modeling program (Kaushal et al. 2008).

Third, due to the limited geographic scope of the interviews, only articles that covered research or practice within the United States were reviewed. Fourth, journals were then screened for a minimum of 10 articles from each journal needed to match the parameters set forth in the Boolean code – this criterion ensured that only journals with a sufficient breadth of articles were included within the review, a third illustration of the concept of theoretical saturation (Glaser and Strauss 1967). Finally, the fifth criteria for the article screening process included up to 25 articles from each journal being recorded within a spreadsheet. 220 articles resulted from this screening phase.

The final phase of the literature review selection process included a two-phased process. First, the 220 articles that resulted from the article screening phase were sorted by their degree of influence (number of citations per year). From this sorting, the five articles with the highest degree of influence were selected for inclusion in the research effort. This final phase resulted in 55 articles from 11 journals being included in this research study, see Appendix I.

**Objectivity – Reliability, Validity, and Error Reporting**

Two tools are required to measure objectivity in qualitative research: reliability and validity; additionally, a discussion of potential error is critical to understanding these two concepts (Bailey 1982; Kirk and Miller 1986). Reliability is defined as the documentation of procedures (Kirk and Miller 1986) and consistency in execution of the methodology (Bailey 1982). In this thesis, reliability has been achieved through the documentation of procedures, consistent execution of the methods via the same researcher conducting the interviews as well as asking the same interview questions of every interviewee, the use of multiple methods to accumulate knowledge, and the use of the same structure for evaluating the literature review and interview methods.

Validity is measured as the degree of "truth" in the method, whether the method is measuring the right concept or interpreting the data or themes correctly (internal validity) or the method is able to be generalized to a larger population (external validity) (Bailey 1982). External validity is expected to apply (be generalized) to the Western United States, as the interviewees are be selected from this region, though applicability beyond this area is likely. Internal data validation will occur in three main processes: triangulation, member checking and peer examination. As noted above, triangulation is the use of more than one research method and "reflects an attempt to secure an in-depth understanding of the phenomena in question (Denzin and Lincoln 2000, 5, see also Charmaz 2003, Creswell 2003). In this study, triangulation occured through the combination of intensive interview methods and the literature review and the use of the Likert scale metric to identify frequency patterns and the similarities, differences and gaps between the theory (literature) and practice (interviews).

Member checking is the process of holding follow-up conversations with interviewees to inform the research if concepts are properly captured (Creswell 2003; Johnson 2002). Member checking occurred through follow-up with interviewees as needed to clarify concepts or when recommended by peer examiners.

Peer examination is the process of debriefing with colleagues or advisors on the analysis processes and outcomes to verify the story being told by the research (Creswell 2003). In this study, peer examination was employed through bi-weekly review of all major concepts by the thesis' major professor and periodic full review by the entire thesis committee, as needed. Also, initial coding schemes, including the grounded theory and Likert scale metric, were reviewed by the project's PI for a review of how each coder creates categories, achieving intercoding reliability (Weber 1985), see Data Collection section below.

Errors within qualitative research are defined as the "lack of validity or reliability" (Bailey 1982, 75). As it has been noted that perfect validity can never be achieved (Kirk and Miller 1986), multiple protections to reduce error were put in place throughout this research study, such as the reliability and validation processes noted above and throughout the document. When errors occurred during the research study, every effort was made to correct for the errors; these errors (or potential errors) are described in the conclusions section.

**Protection of Human Subjects**

Specific to this study, the following procedures were implemented to protect the research subject's privacy and to ensure validity of the data: (1) interviews began with an introduction to the project, including the research objectives and how the data will be

used, and written permission to proceed with the interview (see Appendix III for the Utah State University's Institutional Review Board approved letter of information); and (2) verbatim transcriptions of interviews and written interpretations and reports were offered to research participants for their review before making his or her final decision regarding research participation. Where conducted over the telephone all Federal Communications Commission's (FCC) regulations were adhered to (FCC 2008). As this research is focused on two integrated, open space planning models, the models remain explicit with the research findings but all individuals remain anonymous.

All interview records were anonymously identified by number, with all contact information linking interview data and audio recordings to the participants removed. As this research is intended to be used as a basis for a future dissertation, records will be kept for five years from the completion of this research and, at that time, will be destroyed. Only this author and the thesis' major professor had access to the interview data; all data and audio recordings were stored in a locked file in the Co-PI's office.

## Stage Two: Discovery – Data Collection

Data collection was carried out using two methods: intensive (face-to-face or telephone-based) interviewing and an extensive literature review. Methods, grounded theory and Likert scale metric, used the same analytical structure, allowing for reliability to be achieved. Tests for intercoding reliability were conducted; intercoding agreement was found to be above suggested rates (Hartmann 1977).

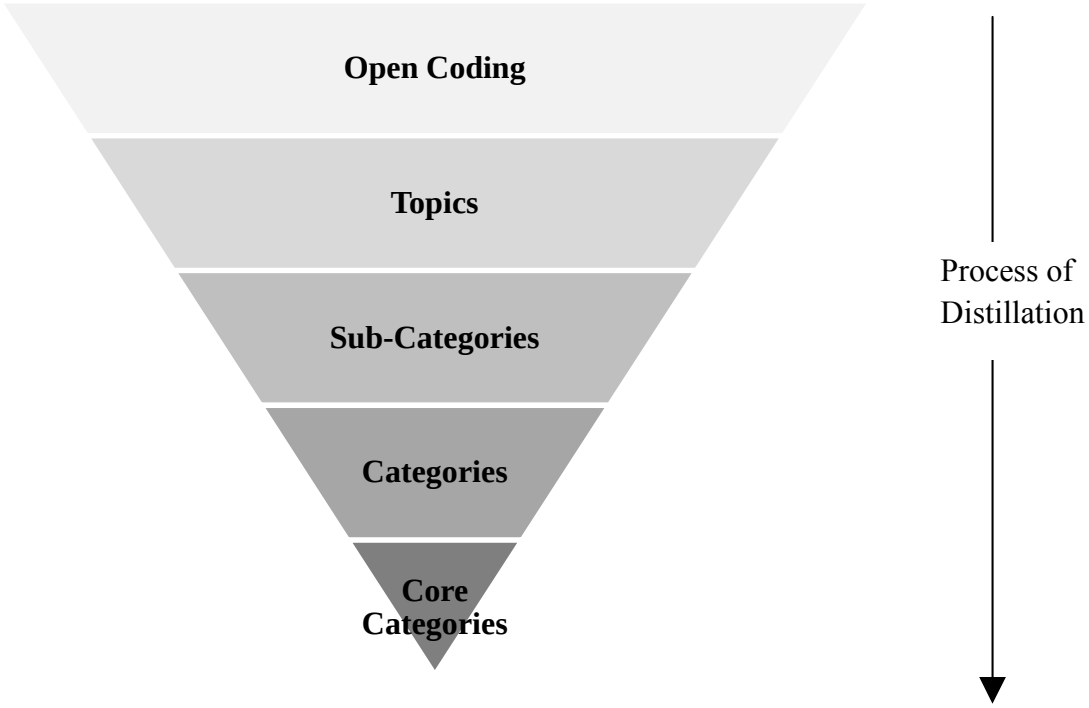



Figure 6: The coding process developed through this thesis research – from the initial open codes assigned to the transcripts or articles that lead through the process to the development of core categories.

## Grounded Theory – Coding Process

Data collection and analysis used a conventional grounded theory format, where the concepts and categories are identified from the data and not with predetermined hypotheses (Hsieh and Shannon 2005). Three iterative and concurrent analysis phases occurred in this research study: coding, memoing, and category identification and verification. In this study, core categories were developed through a process of distillation (Figure 6), from the initial open coding process to the development of subcategories, and then finally through the synthesizing of the subcategories into categories and core categories. From this coding process, the integrated open space paradigm was

created and situated within the Pressure-State-Response Framework (see Findings, Chapter IV).

**Coding – Open and Selective**

According to Corbin and Strauss (1990), coding takes place in two stages: open and selective coding (Table 6). Open coding focuses on the process of maximizing similarities and differences amongst the data and the development of provisional categories (Corbin and Strauss 1990; Creswell 2003). Whereas open coding focuses on the development of temporary categories, selective coding constructs the basis for the core category, or the proposed grounded theory derived from the iterative analysis and data collection process. Coding has been accomplished using established methods for analyzing collected data, including coding transcripts line-by-line, coding within each question, and coding within and across contexts (Charmaz 2003; Clarke 2003). Emphasis on a holistic perspective of the data has been maintained throughout the coding efforts (Creswell 2003; Strauus and Corbin 1990; Tesch 1990). An example of the coding process is provided in the Results chapter, page 61.

**Table 6:** Coding Types within Grounded Theory (adapted from Corbin and Strauss 1990)

| Coding Type | Definition | Purpose | Product |
|---|---|---|---|
| **Open** | Compare situations to derive similarities and differences | "Break through subjectivity and bias" (Corbin and Strauss 1990, p. 13) and to remove errors through regular review and comparisons | Development provisional categories |
| **Selective** | All categories are synthesized under one core category | To identify the central theory of the study | core category, rationale |

**Memoing**

Memo writing is an active form of data analysis that seeks to tease apart different categories, realizations, and concepts. As Charmaz (2003, 322) notes, "memo writing links coding to the writing of the first draft of the analysis; it is the crucial intermediate step that moves the analysis forward," with a movement from more free and loose writing initially to tighter writing styles during the revision and data reduction processes. Clarke (2003) suggests memoing should occur after each data review and coding analysis process. In this study, memos were kept in the authors' thesis journal and are available upon request.

**Category Identification**

Strauss and Corbin (1990) stressed that as the process of grounded theory moves from a focus on data collection to data analysis, though the processes still occur simultaneously, the use of deductive thinking joins with the inductive thinking in category identification. The authors suggested that, while each category identification will range along a continuum from strict analysis to a more inductive process of discovery and pattern recognition, researchers should "move between asking questions, generating hypotheses and making comparisons" to recognize the categories in which the data can be sorted (Strauss and Corbin 1990, 131). Theoretical sampling, or "sampling to develop the researcher's theory, not to represent a population" (Charmaz 2003, 325) has been used to obtain theoretical saturation. Clarke (2003) notes this could include resampling of the existing practitioners through follow-up interviews, the addition of case studies to supplement interview knowledge, contacting new practitioners, or the practice of situational mapping (Clarke 2003) to illuminate a less-understood component of the

theory. In this grounded theory research, an extensive review of the literature, discussed below, accomplished the theoretical sampling process.

## Likert Scale Metric

A Likert scale metric was applied to each coding mention, or portion of the interview or journal article that was coded, with rankings ranging from "1" meaning something that the interviewees or literature suggests should be avoiding or not done to the opposite spectrum where "5" would indicate something that must be done or has to be done (see Table 7 for examples). All rankings are included within excerpts in the results sections for increased transparency of the metric's application.

Table 7: Examples of how coding mentions were ranked using the Likert scale metric (all examples from Daniels and Lapping 2005).

| Ranking | Sample of Key Words | Example |
|---|---|---|
| 1 | Avoid, do not, fundamental challenge | "This growth bias is inimical to the retention of open space, farmland and natural areas, or the creation of tax-exempt public parklands" (Page 318) |
| 2 | Concern, lacks, may not, | "Several studies indicate the negative impacts of land-fragmenting sprawl on wildlife habitats" (Page 324) |
| 3 | Does, may, might, thinks | "Greenways and trails provide recreational opportunities, such as walking…" (Page 321) |
| 4 | Should, strongly, highly recommends, tended | "The land preservation literature makes strong arguments in favor of preserving three types of land within cities and suburbs: parklands, greenways and trails" (Page 320) |
| 5 | Must, have to, always, necessary | "It is also necessary to secure a critical mass of forestland in order for the industry to survive" (Page 324) |

## Intercoding Reliability

To improve the quality of the grounded theory and the Likert scale metric, a test for inter-coding reliability was conducted on one of the interviews (CE4). For the Likert scale metric, an 85.7% agreement on the intercoding reliability was achieved (60/70 codes). This researcher and the thesis' major professor, Dr. Carlos Licon had an intercoding reliability agreement rate of 87.1% agreement (61/70 codes) for the grounded theory, or concept identification, portion of the coding. These intercoding reliability scores are consistent with accepted averages, which suggest an 80% agreement rate (Hartmann 1977). To ensure increased reliability throughout the coding process, the major professor and this researcher reached consensus on the remaining codes (10/70 for the Likert scale metric and 9/70 for the grounded theory).

## Interview Data Collection

For the interviews, data collection occurred in a three-phased method: handwritten notes during the interview, the tape recordings and the resultant verbatim transcriptions, and a written debriefing, by this researcher, of the major concepts that took place during the interview immediately upon the interviews completion. Handwritten notes include summaries of the conversations, including ideas that arose as the interviewer listens to the interviewees and summaries of the context, including the location and surroundings in which the interview took place. The audio recordings were conducted via a digital recorder (SONY, model ICD-PX720) with a telephone pickup (Olympus, model TP7) for telephone interviews; all audio recordings were transcribed verbatim (McCracken 1988). Finally, a written debriefing by this thesis' author

immediately following the interview allowed the researcher to capture what was said during the interview and to identify important concepts that arose during the questioning (Allen personal communication 2009). These three methods for knowledge accumulation within the interview process allowed for maximum reliability to be captured when beginning the data analysis phase.

More specifically, the interview questions incorporated the tenets of the "Total Design Method" where questions were designed to be conversational (Dillman 1978). Dillman (1978) suggests there is a hierarchy in writing interview questions, where researchers must first specify the information they seek in their questions, e.g., beliefs or attitudes; second, they should identify the question structure, e.g., open ended or closed; and, finally, with these two aspects determined, the interview questions can be formulated (Figure 7).

In this research, the dominant type of information sought was the practitioners' behavior (what they do), with additional questions focused on beliefs (why they do what they do) and attributes (basic demographic information to understand the makeup of the

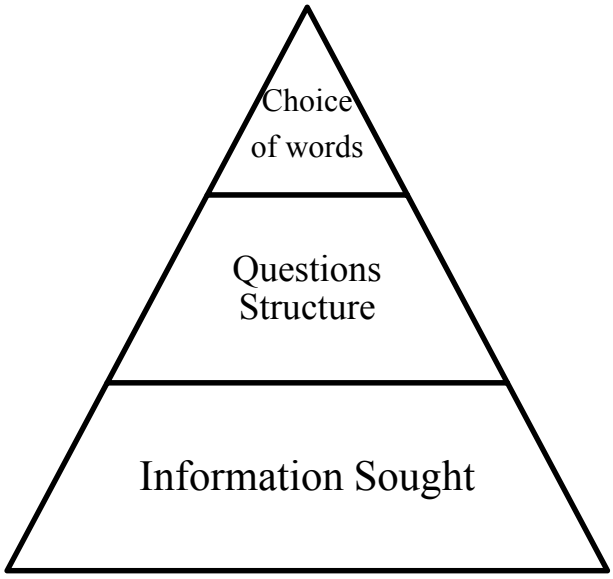



Figure 7: Hierarchy of how to formulate interview questions, with the information sought from respondents forming the basis of the questions structure and the choice of words (adapted from Dillman 1978).

different practitioners). Question structure was open-ended. As Dillman noted, open ended questions are "indispensible for exploratory studies in which the researcher's main purpose is to find the salient aspects of a topic" (1978, 87). Dillman also noted that choices of words should attend to certain common issues, such as whether the questions are too vague or too precise, too simple or too complex, etc. To account for this, reviews of the proposed questions were completed by this research's thesis committee, a professional sociologist (Dr. John Allen), and a staff member in the Environment and Society Department of the College of Natural Resources who frequently develops open-ended survey questions (Ms. Judith Kurtzman). Finally, for reliability purposes, all interviewees were asked the same questions (see Appendix IV for full list of questions).

### Literature Review Data Collection

As discussed in the Literature Review Sampling Design section, 55 articles were selected for inclusion in this research effort (see Appendix I for full list of articles).

## Stage Three: Interpretation – Analysis

Kirk and Miller describe the interpretation period as a time to "ponder the validity, reliability and overall meaning of materials" (1986, 67). As noted above, the data collection and analysis phases took place simultaneously, to allow for the creation of the grounded theory. Specifically, data analysis was conducted in two phases: the first phase included the separate analyses of the literature review and the interviews, the second phase consisted of a combined analysis of the two methods to gain understanding on the similarities, differences and gaps found between the two methods.

Analysis Phase 1 – Separate Analyses on the Interviews and Literature

For the interviews and literature review, the transcriptions were read twice prior to beginning the analysis, allowing the researcher to fully grasp the various concepts presented. Upon the third reading, the analysis consisted of three phases: 1) looked for categories or key concepts that arise through line-by line coding (Charmaz 2003; Clarke 2003); 2) conducted an assessment of strength or importance of difference concepts through the application of the Likert scale metric (Allen 2008; Porreca 2005); and 3) created tabular displays that illustrated the frequency of each mentions occurrence.

**Grounded Theory Coding Process**

As the open coding of the interviews was completed prior to the literature coding, fourteen additional topics and two subcategories arose through the open coding of the literature review process that did not come out of the interviews (Table 8). Thus, to ensure all data were correctly coded, each interview was reviewed for the new topics and subcategories, thereby completing the process of constant comparison (Holton 2007).

In addition, several coding mentions had more than one meaning. For example, Jabereen's (2006, 43) work on sustainable urban forms made the following statement:

"Greening also has health benefits (Ulrich 1999) and an educational function as a symbol or representation of nature (Forman 2002)." This section of text was coded as both "Educational Role of Open Space" (core category, Open Space Paradigm; category,

Table 8: Illustration of the new category and subcategories that arose from literature review process. Note that the subcategory and topic areas highlighted in bold were included after the literature review and, as noted in the text, every interview was checked for any occurrence of these new concepts. See Table 9 (page 55) for the final list of concepts.

| Core Category | Category | Subcategory | Topics |
|---|---|---|---|
| Traditional Planning Framework | Disconnect | **Planning and Policies** | **Policies and open space values** |
| | Disconnect | **Cultural Models and Individual Behaviors** | **Behavior and open space values** |
| | | | **Cultural models and open space values** |
| | **Built environment** | **Humans and Society** | **Development patterns** |
| | | | **Health effects** |
| | **Built environment** | **Humans and Landscape** | **Species effects** |
| | | | |
| Open Space Paradigm | Engage | Inclusive/collaborative nature of process | **Social equity** |
| | Illustrate | Landscape Ecology and Conservation Biology | **Humans and Landscape** |
| | Illustrate | Quality of life/richness | **Health and Restorative Landscapes** |
| | Illustrate | Quality of life/richness | **Social networks and social capital** |
| | Illustrate | Quality of life/richness | **Social equity** |
| | Illustrate | Quality of life/richness | **Built environment** |
| | Illustrate | Role of economics | **Socioeconomic factors** |

Illustrate; and subcategory, Education) and "Health Benefits of Open Space" (core category, Open Space Paradigm; category Illustrate; subcategory, Quality of Life, and topic, Health and Restorative Landscapes). This use of "double coding" is consistent with other practitioners coding processes (e.g., Hagerman et al. 2010).

## Analysis Phase 2 – Synthesis Analysis

The second stage of analysis included a combined analysis of the literature review and the interviews that resulted in the grounded theory and statistical treatment of the Likert scale metric findings.

### Grounded Theory Analysis

For the grounded theory analysis, the foundation of the grounded theory process is the creation of the core category (Glaser and Strauss 1967; Holton 2007). As Holton notes, "the criteria for establishing the core variable (category) within a grounded theory is that it is central, that it relates to as many other categories and their properties as possible, and that it accounts for a large portion of the variation in a pattern of behavior" (2007, 41). Holton also notes the core category "can be any kind of theoretical code: a process, a typology, a continuum, a range, dimensions, conditions, consequences, and so forth" (40). In this thesis, three core categories were developed from the data and framed within the Pressure-State-Response framework (Table 9), including six categories and thirty-six subcategories. Outputs from the grounded theory include narrative descriptions and conceptual organizations to illustrate the theory.

### Likert Scale Metric

The statistical treatment of the Likert scale measurements was conducted using the Mann-Whitney *U* Test to assess "whether the medians on a test variable differ significantly between two groups" (Green and Salkind 2008). Due to the ordinal nature of the Likert scale metric, and the subsequent lack of "an underlying continuous

Table 9: The Grounded Theory core categories, categories and subcategories. *Note that the Response category is not derived from the data and is instead future research, gaps between theory and practice, and other concepts synthesized from the Pressure and State core categories; thus, it does not have categories and subcategories associated with it. A full list of categories, subcategories, and topic areas can be found in Appendix II.

| Core Categories | Categories and Subcategories |
|---|---|
| **Pressure** | **Category: Built Environment (Inhibitor)** |
| Subcategories | Humans and Landscape; Humans and Society |
| **Pressure** | **Category: Disconnect (Inhibitor)** |
| Subcategories | Cultural Models and Individual Behaviors; Planning and Policies |
| **Pressure** | **Category: Shifting Perspectives (Encouraging)** |
| Subcategories | Paradigm Shifts; Changing landscapes – human and ecological |
| **State** | **Category: Engage** |
| Subcategories | Allows for community open space vision to be developed; Communication issues/level of engagement; Engage diverse stakeholders; Inclusive/collaborative nature of process; Informed citizens/stewardship; Leadership; Open Space Planning is Proactive; Political Nature of Process; Public Engagement; Relationships |
| **State** | **Category: Illustrate** |
| Subcategories | Analysis Process; Analysis Tools; Context & Scale; Education; Framework; Funding; Implementation Process; Implementation Tools; Increases Connectivity with Landscape; Open Space as Assets; Quality of Life; Role of Economics; Role of Science; Transparent Nature |
| **State** | **Category: Commit** |
| Subcategories | Adaptability; Keep Efforts Focused – Set Goals First; Perseverance; Planner's Role; Priority and Decision Making Process; Systems Thinking |
| **Response*** | **Future Research and Gaps between Theory & Practice** |

distribution" (Siegel 1956, 25), the Mann-Whitney *U* Test analyzes the ranking distribution amongst the coding mentions and thus, is the most appropriate test for the metric used in this thesis. The Mann-Whitney *U* test (hereafter referred to as *U* test) was employed within this study to assess the distribution of the medians amongst four group variables:

- The Interviews analyzed against the Literature,
- The CEDAR Interviews analyzed against the Literature,
- The Green Infrastructure Interviews analyzed against the Literature, and
- The CEDAR Interviews analyzed against the Green Infrastructure Interviews.

All statistical analyses were conducted in SPSS version 17.0 (SPSS 2007). All non-responses were excluded from the *U* test analyses to ensure that only mentions that arose during the interviews are analyzed, i.e. any zeros within the analysis were defined as missing discreet values within SPSS. These non-responses were entered as "misses" within SPSS.

Within the *U* test, if the sample size is large ($n \geq 42$ (Green and Salkind 2008)), a *z*-approximation test should be conducted as the test "includes a correction for ties but does not include a continuity correction" (Green and Salkind 2008, 379). Only two of the 36 subcategories had sample sizes (number of interview respondents or articles with coding mentions) equal to or greater than 42: Analysis Tools ($n = 50$) and Implementation Tools ($n = 43$). For these *U* tests, the *z*-approximation test results also are reported. All reported values the asymptotic significance value (2-tailed) with significance reported at $p < 0.05$ (Green and Salkind 2008).

Outputs from the statistical analysis include a synthesized matrix that allows readers to view the similarities and differences in the findings as well as gaps between the two methods. Statistical results on individual tests are included within the Findings Section.

**Stage Four: Explanation – Documentation and Evaluation**

The Findings section of this thesis explores Stage 4: Exploration – Documentation and Evaluation (see Figure 5), where the grounded theory and Likert scale metric results are discussed in further depth. In summary, two methods, grounded theory and the Likert scale metric, were used to investigate the research questions addressed in this study. While the grounded theory process documents the overall processes and practices uncovered in the interviews and literature, the supporting research paradigm employed through the Likert scale metric supports the grounded theory by illustrating the importance of each individual practice or process to the thesis' interview participants or articles reviewed. It should be noted that while the Likert scale metric results cannot be used to illustrate the differences in the importance of the various practices, as will be illustrated within the Findings Chapter, the results can illustrate a ranking amongst the different practices (Allen personal communication 2009). These ranking are useful in understanding which practices are critical to the practice of integrated open space planning.

# CHAPTER IV

# FINDINGS

*"One essential quality of true grounded theory is that it makes sense; put simply, the reader will have an immediate recognition that this theory, derived from a given social situation, is about real people or objects to which they can relate"*

– Phyllis Noerager Stern (Noerager Stern 2007, 114)

Two methods, grounded theory (dominant method) and the Likert scale metric (supporting method), were used to investigate the research questions addressed in this study which seeks to understand the pressures, state of, and potential responses to the field of integrated open space planning. Fourteen interviews of professionals practicing either the CEDAR or Green Infrastructure planning models were conducted to begin to answer this question. As a form of theoretical sampling (Glaser and Strauss 1967), intended to lead to theoretical saturation of the grounded theory (Glaser and Strauss 1967; Holton 2007), a selected set of literature was reviewed and coded to understand the theoretical state of open space planning (see Methods section for a complete description of literature selected). From these investigations, 3,451 coding mentions were recorded, with 1560 coding mentions from the interviews (581 CEDAR and 979 for Green Infrastructure) and 1891 coding mentions for the literature. From these open coding results, thirty-six subcategories and six categories were established within the "Integrated Open Space Planning Framework" grounded theory (Figure 8).

The Findings section of this thesis explores these results in two manners. First, the overall findings of the Integrated Open Space Planning Framework (the adapted PSR framework in Figure 8) are discussed including key findings and connections to theory,

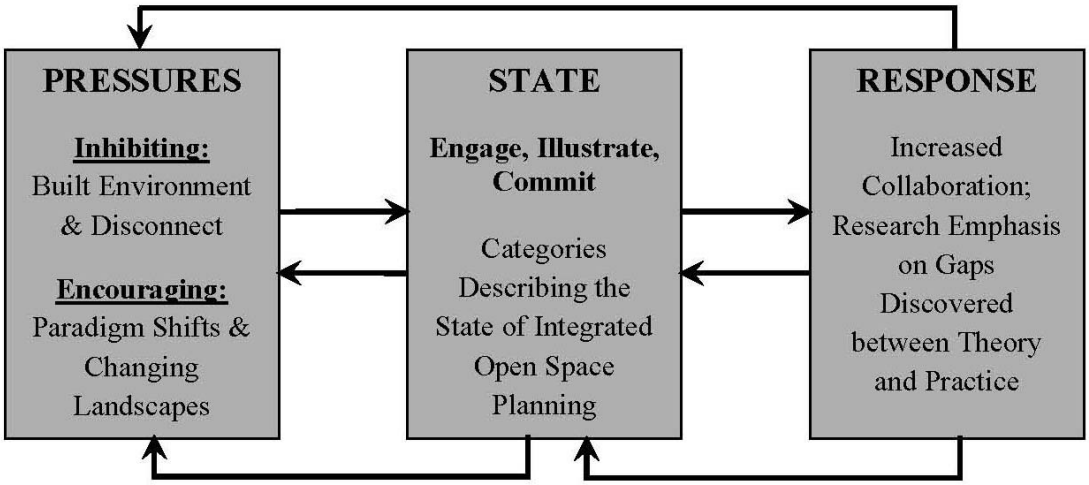



Figure 8: The findings from this study- the integrated open space paradigm – as illustrated through the Pressure-State-Response framework. Pressures were identified that both inhibit and encourage the current state of integrated open space planning. For the state, three categories were uncovered from the data: engage, illustrate, and commit. Finally, responses indicate potential future directions, whether indicated in the literature, the interviews, or through future research identified through this study. Arrows indicate the cyclical nature of the process.

or literature outside of what was coded through this study. Second, a more detailed analysis of the framework is provided, including a description of each of the framework's subcategories, Likert scale metric statistical analyses (Mann-Whitney *U* tests to identify the statistical differences, if any between the participant groups' means), and quotes from participants or authors to illustrate how the grounded theory was derived from the data.

Within each of these sections, quotes from interview participants or authors are provided within a given subcategory to support the categorization of each statement. Each quote includes the participant's quote, the participant's identifier (or author's name), the page number the quote can be found, either in the interview transcript or the journal article, the open coding findings (the initial description of the participant's

statement), and the rank assigned to each statement from the Likert scale metric, see Figure 9.

## Integrated Open Space Planning Framework

This section briefly discusses the overall findings for the Pressure and State components of the Integrated Open Space Planning Framework (Figure 8), as these categories were derived directly from the data (interviews and literature), whereas the Response element is developed within the Discussion Chapter (see page 153) as a synthesis from the thesis findings, additional literature, and this author's experience. The Pressures section highlights the forces, as discussed by the coded literature and interviews, either inhibiting or facilitating the movement toward integrated open space planning. The State section discusses the current state of integrated open space planning

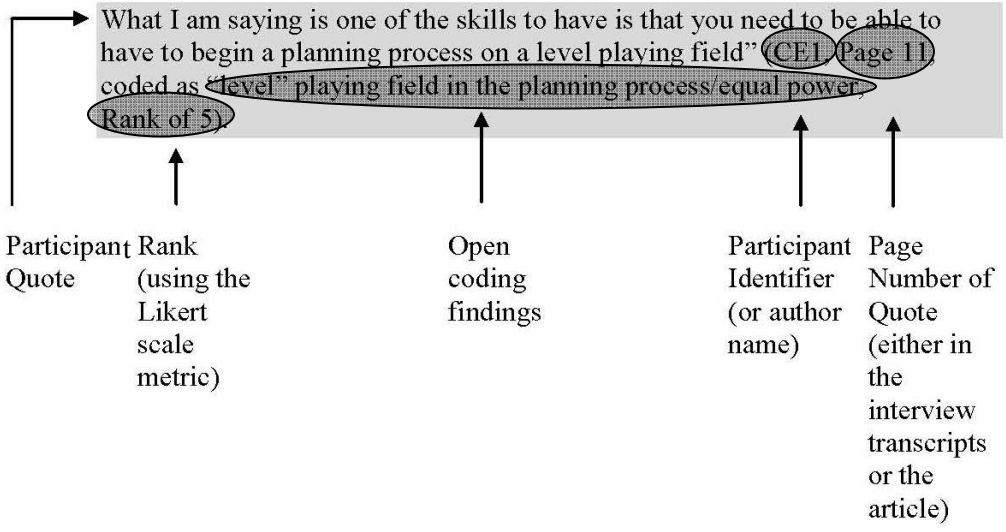



Figure 9: How participant's or authors' quotes are labeled within this thesis. Note the participant identifier and page number arrows are pointing to CE1 and Page 11, respectively.

within three categories: Engage, Illustrate, and Commit. After briefly describing each category within the core categories of either Pressures or State, connections are drawn to theory beyond what was studied (coded and analyzed) in this thesis; these connections to theory help to reinforce the findings from the interviews and literature and to begin setting the stage for future research efforts.

Before diving into each of these two core categories (Pressure and State of the Integrated Open Space Planning Framework), one overall finding is important to highlight. In this research, the average median Likert scale metrics between the interviews and the literature were found to be statistically different ($p < 0.05$) in only four of the thirty-six subcategories. In other words, of the 36 subcategories derived from the theory and practice, thirty-two had similar, average median Likert scale metric rankings. This indicates that the level of importance associated with each subcategory were similar between the interviews and the coded literature. Thus, for a majority of the subcategories discussed within this research, the findings are consistent between theory and practice.

## Pressures – Inhibiting or Encouraging Integrated Open Space Planning

Within Berry's adapted Pressure-State-Response framework (1998), pressures were identified as activities affecting the environment, whereas the state was considered the environment. In this thesis research, pressures are considered those that inhibit or encourage integrated open space planning. Derived from the interview and literature data, three categories of pressures and six subcategories have been identified (Table 10) to provide an initial explanation for the pressures affecting more integrated forms of open

Table 10: The categories and subcategories for the Pressures core category within the Integrated Open Space Planning Framework are highlighted here. Note how, within this research, the Built Environment and Disconnect categories are identified as inhibitors, whereas Shifting Perspectives were seen as encouraging integrated open space planning.

| Core Categories | Categories and Subcategories |
|---|---|
| **Pressure** | **Category: Built Environment (Inhibitor)** |
| Subcategories | Humans and Landscape |
| | Humans and Society |
| **Pressure** | **Category: Disconnect (Inhibitor)** |
| Subcategories | Cultural Models and Individual Behaviors |
| | Planning and Policies |
| **Pressure** | **Category: Shifting Perspectives (Encouraging)** |
| Subcategories | Paradigm Shifts |
| | Changing landscapes – human and ecological |

space planning. While this list cannot be considered exhaustive (as it has been derived from fourteen interviews and fifty-five articles, instead of the entire, extant body of knowledge), it should serve as a first step for framing the barriers and facilitators for planners seeking to be more integrative in their open space planning efforts.

**Pressures Inhibiting Integrated Open Space Planning**

This research defines the concepts arising under the Built Environment and Disconnect categories as the largest pressures inhibiting increased integration in open space planning. Specifically, the Built Environment category highlights the impacts of the built environment in two subcategories: (1) Humans and Landscape, where the effects on ecological processes and patterns are discussed, and (2) Humans and Society, where the effects of the built environment on social process, e.g., equity, access to open space, recreation, etc., are documented.

Instead, the more abstract category entitled “Disconnect” highlights the disconnects identified and classified into two subcategories. The first of these subcategories is entitled “Cultural Models and Individual Behaviors,” where conflicts between our cultural models (including private property rights, the dichotomy between community versus conservation, and notions of equity in open space planning) and individual behaviors (e.g., how individual property owners manage their property and the disproportionate effect this has on ecological systems when the individual actions are aggregated) inhibit planners’ ability to move toward integrated open space planning. The second subcategory “Planning and Policies” highlighted the disconnect between existing policies and open space values, the reactive nature of planning, and how these issues reinforce traditional open space planning of either planning for social or ecological open space needs (but not both).

Almost every research participant, whether from the interviews or the literature, saw these two concepts as insufficient to meet the complex ecological and social needs of society and the environment. The concerns that led to this conclusion of insufficiency are numerous and widespread; the most critical concerns brought out through this research include the following:

- The increasing homogenization of species compositions across urbanized landscapes, regardless of location within the country (Blair and Johnson 2008;
- The deleterious effects of human development patterns on social and ecological systems (Daniels and Lapping 2005; Nelson 2006; Vandegrift and Yoked 2004), especially the loss of connectivity (CE2; Botequilha Leitão and

Ahern 2002; Brown et al. 2000; Chace and Walsh 2006, Esbah, Cook, and Ewan 2009' Hansen et al. 2005; Luck and Wu 2002; Thompson 2004);

- The inadequate cultural models that connect humans with the environment (CE1, CE4, CE5; Forman 2008; Thompson 2004);
- The insufficient planning efforts and policies attempting to address these concerns (CE1, CE2, CE3, CE5, GI1, GI3, GI8, GI9; Brody, Carrasco, and Highfield 2006; Conway and Lathrop 2005; Merenlender et al. 2004); and
- The reactive nature of the planning process (CE1, CE3; Downs 2005).

Connections beyond this Research

These multiple layers of concern reinforce the discussion in the theoretical lens that suggested institutions cannot respond to the complex issues faced today (Antrop 2007; Kato and Ahern 2008). Better ways to address complexity, development patterns that do not degrade ecological and social systems, and new cultural models for viewing the relationship between humans and nature are needed to move beyond the pressures of the Built Environment and the Disconnect categories identified in this research (see Engage, Illustrate and Commit categories for specific examples from this research). As Nelson states in regards to more traditional, static forms of planning, "The rationale for that template no longer exists. We need a new template to guide planning into the next era" (2006, 393).

**Pressures Facilitating Integrated Open Space Planning**

Moving toward an integrated open space planning system cannot happen overnight. Multiple interview participants discussed the need to piecemeal their process in order to get the overall ideas accepted into policy and planning documents (CE3, GI1).

However, two notions were identified within the Pressures core category that may foster this shift toward integrated open space planning: changing landscapes and paradigm shifts. The Paradigm Shift subcategory documents that practitioners interviewed through this thesis and the analyzed literature are suggesting that, in order to practice more integrated forms of open space planning, a fundamental shift in the way the world is perceived may be necessary. Additionally, participants and the literature saw the subcategory of Changing Landscapes – Both Human and Ecological (largely discussed in the Introduction to this thesis) as a pressure encouraging integrated open space planning.

Though only one hundred twenty-two coding mentions were recorded for this core category, these mentions were recorded from eleven out of the fourteen interviews and thirty-one out of the fifty-five articles, indicating their pervasiveness in this research. The most critical topics brought out through this research include the following:

- We live in a dynamic world, especially in light of climate change (GI2, GI7; Solecki and Oliveri 2004);
- Dramatic changes are occurring within the American landscape, especially in the West (Brown et al. 2000; Odell and Knight 2001) from where the interview participants were selected;
- Housing demands are changing (Nelson 2006), and will likely continue to change in light of changing demographics within the United States (Yen 2010);
- Authors and interview participants saw the notion of a paradigm shift as both a process and a state (Botequilha Leitão and Ahern 2002; Cutchin 2007;

Haight, Snyder, and Revellet 2005; Lee and Moudon; Luck and Wu 2002; Mayer et al. 2009; Nelson 2006; Thompson 2004);

- There is a great sense of urgency in moving toward landscape integrity Botequilha Leitão and Ahern 2002; Daniels and Lapping 2005; Jabareen 2006; Nelson 2006); and
- The need for a paradigm shift goes beyond the planning world – science too may need to become more integrative (Nassauer and Opdam 2008).

Connections Beyond This Research

As discussed above, while the coding mentions were pervasive throughout interview transcripts and the literature, the lack of depth in these categories, notably the concept of a paradigm shift, suggests a need to look outside of the field of open space planning to test this finding. The confirmation of this finding is abundant. In a recent qualitative study of leading scientific practitioners perspectives on biodiversity conservation in light of climate change, Hagerman et al. found "All interviewees expressed the view that a paradigm shift in conservation practice was required to adapt to the impacts of climate change" (2010, 195). In addition, natural resource managers have echoed similar statements; for example, Armitage et al. make the following statement in their article entitled "Adaptive co-management for social-ecological complexity," where the authors noted "a reinvention of resource management is underway" (2009, 95).

Yet, the concept of a paradigm shift is not new. Rosenberg (1986) highlighted the need for a shift from seeing the environment from a stewardship perspective to a more holistic perspective *sensu* Thompson (2004) almost twenty-five years ago. Rees (1995) noted the following, "Many scientists, policy analysts, and even politicians argue

sustainability will require a "paradigm shift" or a fundamental change in the way we do business, but few go on to describe just what needs to be shifted or any implications for the status quo" (344). The difference this research highlights, as compared to what Rees identified in 1995, is that we now have a better understanding of the implications and, in the next core category (State of Integrated Open Space Planning), specific tools to foster this shift are discussed.

### Summary of the Pressures affecting Integrated Open Space Planning

The Pressures category developed through this research effort suggests there are both pressures that facilitate and those than discourage the movement toward integrated open space planning. While these pressures may be affecting the majority of planners within this country from practicing open space planning from a more integrated perspective, the fourteen practitioners interviewed and the fifty-five articles coded and reviewed as a part of this effort were able to overcome these pressures in order to practice open space planning that incorporates both social and ecological concepts (though these concepts are incorporated to varying degrees depending on the planning model employed and the individual practitioner or researcher). Next, the State category of the Integrated Open Space Planning Framework is explored.

## State of Integrated Open Space Planning – Engage, Illustrate and Commit

In this study, the State of the Integrated Open Space Planning Framework is a compilation of the practices and processes identified during the research that is either practiced by the study's interview participants or researched by the coded literature's authors. As discussed above, within the adapted PSR framework, the "State" element

considers the present state of the environment; in this study, it is considered to be the current state of practice or research. Three categories best describe the state of integrated open space planning: Engage, Illustrate, and Commit (Table 11).

Each of these categories reinforces and supports planners, the public, and the process in the integration of integrate open space planning frameworks. Several interview participants (CE3, GI1) and one article (Conway and Lathrop 2005) highlighted the need for multiple, reinforcing tools within the planning toolbox, and this core category supports this notion. With thirty subcategories and well over 80% (82.6% to be exact) of the coding mentions within this grounded theory analysis, the extensive set of tools and discussions this research can provide to planners cannot be understated. However, as individual practitioners do not have the time necessary to review all of the data, the critical issues are discussed below, outlined by category due to the breadth and depth of the coding mentions within this core category.

**Engage**

In the discussion in Chapter II, Theoretical Lens, emphasis for how to incorporate social elements into ecologically-based open space planning focused on the inclusion of participatory planning methods. In this category, additional practices and processes are discussed, ranging from how the processes allows shared visions to be developed to the inclusive nature of the planning process. Whether discussing the aforementioned terms or the political nature of the process, necessary leadership for success, or the relationships that planners have, the focus of this category was engagement. Engagement encompassed each of these terms as it illustrates the need to involve others, whether from a public perspective of involvement in the planning or

Table 11: The core categories, categories, and subcategories for the Integrated Open Space Planning framework.

| Core categories | Categories and Subcategories |
|---|---|
| **State** | **Category: Engage** |
| Subcategories | Allows for community open space vision to be developed |
| | Communication issues/level of engagement |
| | Engage diverse stakeholders |
| | Inclusive/collaborative nature of process |
| | Informed citizens/stewardship |
| | Leadership |
| | Open Space Planning is Proactive |
| | Political Nature of Process |
| | Public Engagement |
| | Relationships |
| **State** | **Category: Illustrate** |
| Subcategories | Analysis Process; |
| | Analysis Tools |
| | Context & Scale |
| | Education; |
| | Framework |
| | Funding |
| | Implementation Process |
| | Implementation Tools |
| | Increases Connectivity with Landscape |
| | Open Space as Assets |
| | Quality of Life |
| | Role of Economics |
| | Role of Science |
| | Transparent Nature |
| **State** | **Category: Commit** |
| Subcategories | Adaptability |
| | Keep Efforts Focused – Set Goals First |
| | Perseverance |
| | Planner's Role |
| | Priority and Decision Making Process |
| | Systems Thinking |

implementation process to how the planner engages relationships and community leaders to lead to success. Some of the most important issues that arose from the data are highlighted below:

- The integrated open space planning process allows for a shared vision to be developed (CE1, CE2, CE5, GI2, GI3, GI4; Berke 2002), reinforcing the paradigm shift concepts from an individually-focused society to one of partnership;
- The role of messaging and marketing is critical to framing these complex issues (CE3, GI5, GI7, GI8, GI9; Sagalyn 2007; Troy et al. 2007);
- Though not always a reality, engaging diverse stakeholders remains an important objective;
- Along these lines, the inclusive and collaborative process is key – everyone should be allowed to have a genuine voice in the process (CE1, CE3, CE4, CE5, GI2, GI3, GI5, GI6, GI7, GI8) though planners must recognize the time involved in this process and plan accordingly (GI5);
- Many participants felt that stewardship is enhanced by informed citizens (CE1, CE4, GI5, GI7) and a sense of place (CE1; Lee and Moudon 2004; Rodriguez, Khattak, and Evenson 2006);
- Project champions are strongly influential in project success (Average ranking of 4.3; CE2, CE3, CE4, CE5, GI3, GI5, GI7, GI9; Carter and Fowler 2008; Sagalyn 2007);

- Beyond general engagement, steering committees are used as both sounding boards (CE1, CE2, CE5, GI2, GI5, GI6) and for political guidance (CE2, CE4; Sagalyn 2007);
- Contrary to the traditional planning, open space planning should be proactive;
- These processes are political – elected officials and decision makers should be engaged in the process;
- Not highlighted at all in the articles, the topic area of willing communities was strongly important to the practitioners (average median rank of 4.2);
- Relationships, including community relationships, social and research connections, and trust, are important; and
- Almost no networking between practitioners appeared to be occurring, as indicated by the lack of knowledge of other practitioners practicing integrated open space planning.

Connections Beyond This Research

Engagement in the open space planning process, whether through the public or stakeholders, has almost become a ubiquitous planning practice (Reed 2008; Webler, Tuler, and Krueger 2001). Surprisingly, the Public Engagement subcategory only had a 3.6 overall ranking average on the Likert scale metric; however, the Engage Diverse Stakeholders subcategory had an average ranking of 3.9 (indicating a strong encouragement for this practice). This could serve to reinforce some of the discussion within the Theoretical Lens that engaging stakeholders in a process is more important than just engaging the public at large (Brody, Carrasco, and Highfield 2006; Reed 2008; Shandas and Messer 2008). An alternative explanation for these rankings is that public

involvement has become commonplace within the planning process (Reed 2008; Webler, Tuler, and Krueger 2001) and that some planners did not feel the need to emphasize this area. Further probing is required to confirm either prediction.

Additional connections to theory include the need for relationships with professionals beyond what was identified in this study. Specifically, several authors (Cowling, Pierce, and Sandwith 2002) and one document that synthesizes conservation thresholds (Environmental Law Institute 2003) highlights the need to not only have relationships with the community but for planners to also develop relationships with professionals in the field of conservation. Other studies have noted the need for more proactive forms of planning (Ahern 1991, 1995) to address the pressing needs of society. Finally, the concept 'political nature of the process' derived from the study's data is heavily reinforced in the literature (Agrawal and Gibson 1999; Albrechts 2003; Asikainen and Jokinen 2009; Balram, Dragićević, and Meredith 2004; Bengston, Fletcher, and Nelson 2004; Wiens 2007), whether through the notion that all planning is a social construct (Albrechts 2003) or that supporting biodiversity programs requires the support of the local community whose policies will change as a result (Balram, Dragicevic, and Meredith 2004).

**Illustrate**

Just as planners need to relate and engage with the public and various stakeholders, so does the public need to be able to relate to the planner, the process, and the planning tools (CE2). This paraphrased coding mention by interview participant CE2 summarizes this category: once the public, stakeholders, and decision-makers are engaged, planners and the process need to illustrate a successful process, both planning

and implementation. Additional, important findings in this category are highlighted below, categorized by processes and practices.

Processes:

- Context may be important than content (Botequilha Leitão and Ahern 2002), in other words, an excellent plan developed in New Jersey may not work in Utah. Therefore, know your place;
- The local level (municipality) is where development and most processes of change occur (Brody, Carrasco, and Highfield 2006; Jepson 2004; Sagalyn 2007; Talen and Knapp 2003) and is the most practical and relatable (Nassauer and Opdam 2008);
- However, the regional level may be a better place to address these multifaceted issues (Bengston, Fletcher, and Nelson 2004; Berke 2002; Botequilha Leitão and Ahern 2002; Brody, Carrasco, and Highfield 2006; Bryant 2006; Daniels and Lapping 2005; Downs 2005; Forman 2008), yet, regionalism may not resonate with constituents (GI7);
- The CEDAR and Green Infrastructure models provide a framework upon which integrated open space planning can occur, but avoid thinking any one process or tool is a panacea (CE3, GI1; see also Forman 1995; Hellmund and Smith 2006);
- Planners need to incorporate economics more into their toolbox (GI2); changing housing demand could increase possibilities for integrated open space planning;

- The collaborative process and proper messaging can lead to increased funding opportunities (GI5, GI9);
- Transitioning from analysis to implementation is difficult; a best practice is to identify what can actually be accomplished to increase the likelihood of success (CE3, GI1, GI2);
- Open space assets may be in unlikely places, e.g., utility corridors;
- There is a disparity in who is affected by and connected to open space; equity was rarely discussed within the interviews. This may indicate a gap in practitioner knowledge;
- Landscape ecology should serve as the ecological basis for integrated open space planning (CE3; Botequilha Leitão and Ahern 2002; Forman 2008);
- Being clear and transparent about your process is important. Acknowledge uncertainty.

Practices:

- Analysis tools should not limit the planning process; in fact, some argue there is too much focus on analysis (CE3, GI1; Bryant 2006);
- Not surprisingly, the most frequently used analysis tool was GIS, though other map-based software, qualitative tools, and quantitative tools were employed;
- Data management and quality is critical – the analysis process relies on it; document your process.
- Educational tools keep planners connected with the public (GI8) but need to be practical and relatable (Thompson 2004) to resonate and facilitate change.

- Twenty-one types of open space tools were discussed in this research; Bengston, Fletcher, and Nelson (2004) identified 31 policy tools to protect open space. As discussed above, the use of multiple, reinforcing tools will increase the likelihood of success.
- Effective implementation requires policy changes (CE1), though some tools, e.g., downzoning, may actually harm ecological systems (Conway and Lathrop 2005; Hansen et al. 2005).

## Connections Beyond This Research

One of the most intriguing aspects of this research is the duality of findings between the fact that most planning takes place at the local scale (Brody, Carrasco, and Highfield 2006; Jepson 2004; Sagalyn 2007; Talen and Knapp 2003), yet, regional coordination, which is considered to be less relatable to the average citizen (GI7), may need to be where integrated open space planning takes place (Bengston, Fletcher, and Nelson 2004; Berke 2002; Botequilha Leitão and Ahern 2002; Brody, Carrasco, and Highfield 2006; Bryant 2006; Daniels and Lapping 2005; Downs 2005; Forman 2008). This notion of individual connection to a region is supported in research by Brunckhorst, Coop, and Reeve (2006) and Innes et al. (1994), where these authors argue regionalism must coincide with a shared sense of identity for the region. In other words, individual citizens must feel physically or emotionally connected to the region, whether through landscape homogeneity (Brunckhorst, Coop, and Reeve 2006) or political collaboration (Innes et al. 1994). Thus, identifying ways to increase a sense of identity with a place, such as through physical visits to the region, or through increased collaboration with

citizens across the region, may help to reduce the feeling that one cannot relate at a regional scale.

As noted above, the avoidance of any one tool or framework as a "panacea" was recommended by several participants. As found in Polasky et al. (2005), the use of scenarios to test varying models may be a useful tool for identifying how to optimize the benefits to multiple resources as opposed to a single variable. Indeed, Forman (1995, 520) suggests the use of multiple variables within a planning process should include a focus on "optimization instead of maximization" of any one variable. Thus, using alternative futures or other scenarios to examine potential outcomes was seen as a useful tool in integrated open space planning, especially when planners seek to balance out benefits to social and ecological variables.

**Commit**

While the Illustrate category focuses more on spatial practices, this category highlights the temporal needs of the open space planning paradigm. Important findings in this category are noted below:

- There is great need for adaptability, innovation, and a willingness to take risks in these complex planning processes, both by planners and the process itself (CE1, CE4, GI2, GI5, GI7; Carter and Fowler 2008; Cutchin 2007; Day 2006; Nelson 2006; Sagalyn 2007);
- While adaptability is important, having a focused process (through goals or priorities) is still imperative (CE3, CE4, GI2, GI4, GI6; Botequilha Leitão and Ahern 2002; Carter and Fowler 2008; Sagalyn 2007);

    - These projects are complex and time-consuming – perseverance is very important (CE1, CE2, GI7, GI8, GI9; Merenlender et al. 2004; Sagalyn 2007);
    - Planners need to be multi-faceted – they must have the following:
        - A broad base of knowledge (GI7, GI8, GI9; Brabec, Schulte and Richards 2002; Zipperer et al. 2000), including technical knowledge (CE1, CE2, CE4, GI5, GI6, GI7, GI8, GI9; Hansen et al. 2005; Jepson 2004; Nelson 2006);
        - The ability to engage (CE1, CE4, GI5, GI6, GI7, GI8);
- Drivers in the priority and decision-making process are multi-faceted and vary based on goals and context, though in this research, drivers included consensus, ecology as priority setters, the role of the public and stakeholders, and social processes; and
- Systems thinking includes the integration of social and ecological frameworks and the integration of various professions.

Connections Beyond This Research

The Commit category highlights the need for adaptability, risk-taking and perseverance within more integrated forms of open space planning. These concepts appear to contrast with the most dominant planning model practiced today (in the United States) – the rational planning model (Lachapelle, McCool, and Patterson 2003) – where goal and priority setting at the start of a project are paramount. At the same time, research participants indicated efforts still need to be focused (outcome-oriented), though participants emphasized flexibility in allowing project outcomes to respond to changing project needs. As one participant commented:

> You'd asked me before about setting priorities, but a lot of these are external factors, that come at you, that you really can have the best strategic plan in the world but as things evolve you have to be flexible (GI9, Page 27, Coded as Flexibility, Rank of 5).

These findings also highlight the role systems thinking can play in helping planners adapt to complexity. While most participants discussed the need for thinking holistically in their own field, one article suggested science may need to be more integrative as well:

> This would mean a change in science - from an emphasis on analysis and reductionism toward a goal of synthesis and integration that challenges conventional norms of scientific adequacy (Nassauer and Opdam 2008, Page 634, Coded as Fundamental changes in scientific paradigm needed, Rank of 3).

Thus, while the static nature (inflexibility) of planning was identified as a pressure inhibiting the movement toward more integrated forms of open space planning, this category suggests a more complex role for planning, acknowledging that efforts must be complex and adaptable yet still remain focused.

### Summary of the State of Integrated Open Space Planning

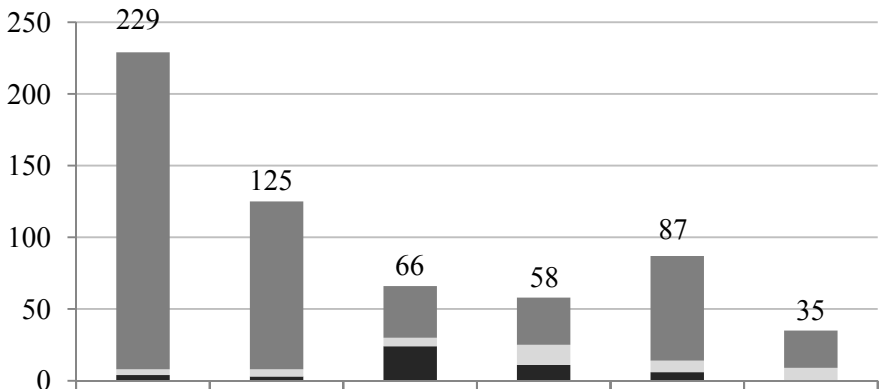
While only four areas of integration were discussed within the theoretical lens section (public participation tools into ecologically-based plans, the incorporation of ecological concerns into socially-based plans, flexible institutions, and systems thinking, see Table 2), this research has uncovered thirty processes and practices that support the Open Space Paradigm. A summary of each of this study's subcategory average median rankings from the Likert scale metric are illustrated in Figure 21 (see page 152) to indicate the strength each participant or article associated with the categories.

## Research Data Supporting the Paradigm

Now that an understanding of each core category's main concepts and critical components have been developed, a more detailed analysis of each subcategory is presented. In this section, each subcategory is discussed using detailed quotes on the topic areas that arose out of each subcategory (if any), major findings, and the results of each subcategory's Mann Whitney *U* Test, if any statistical significance has been identified ($p < 0.05$). Statistical significance is indicated in each summary graph (see Figure 9, page 61, for an example) by a (*) adjacent to the subcategory. Highlights from the subcategories are presented under each of their respective core categories. For a full description of the Mann Whitney *U* Test results, including descriptive statistics, see Appendix V.

### Core Category: Pressures – Inhibiting or Encouraging Integrated Open Space Planning

The core category of Pressures arose from three categories: Built Environment, Disconnect, and Shifting Perspectives. This core category shows how interview participants and the literature viewed the pressures on integrated open space planning, whether they were seen as inhibitors or facilitators to being more integrative. While one interviewee did not find the Built Environment or the Disconnect to be an inhibitor to her form of integrated open space planning, all others discussed some degree of tension between the inhibiting categories of Built Environment and Disconnect and the goals they sought to reach, whether they were practitioners or researchers. A summary of the total coding mentions for each of these subcategories can be seen in Figure 10; a summary of the average median from each participant group can be seen in Figure 11.




| | Humans and Land-scape | Humans and Society* | Planning and Policies | Cultural Norms and Individ-ual Behaviors | Changing Land-scapes | Para-digm Shifts |
|---|---|---|---|---|---|---|
| | Built Environment | | Disconnect | | Shifting Perspectives | |
| Literature | 221 | 117 | 36 | 33 | 73 | 26 |
| Green Infrastructure | 4 | 5 | 6 | 14 | 8 | 9 |
| CEDAR | 4 | 3 | 24 | 11 | 6 | 0 |

Figure 10: Coding mentions by the participant groups, categorized by category and subcategory for the core category Pressures. Data labels on top of each column indicate the total coding mentions for each subcategory.

**Category: Built Environment**

Coding mentions in the Built Environment category were dominated by the literature (three hundred forty-one out of the three hundred fifty four mentions were from the articles). Two subcategories arose from the data – (1) Humans and Landscape and (2) Humans and Society. Both of these subcategories discuss the relationship between the humans and the built environment, either focusing on the relationship between humans and the landscape or humans and society.

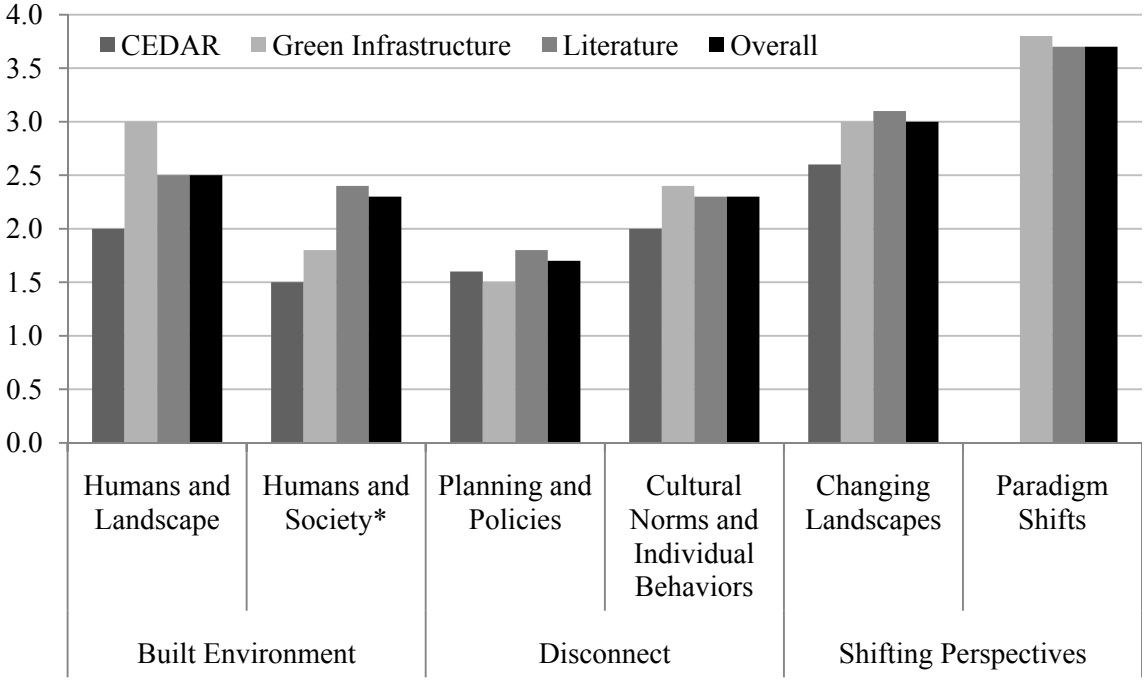



Figure 11: Average median rankings of the varying participant groups by category and subcategory for the core category Pressures. Note that an average median ranking for the Paradigm Shifts subcategory is not available for the CEDAR method as no interviewees' statements were coded within this subcategory.

Humans and Landscape

Five interview participants and twenty-seven articles have coding mentions within this subcategory. Of the two hundred twenty-one coding mentions, an overall ranking average of 2.7 was assigned to this subcategory using the Likert scale metric results. Median rankings within this subcategory were 2.5 for the CEDAR participants, 3.0 for the Green Infrastructure participants, and 2.5 for the literature, with an overall average median of 2.5. The distributions within the groups did not differ significantly (Mann–Whitney $U = 51.5$, $n = 32$, $P = 0.386$ two-tailed).

Two general areas were discussed within this subcategory: the effects of humans (through the built environment) on the landscape overall and the effects of human

development on species. Within the effects of humans on the overall landscape, the lack of connections between humans and the landscape were frequently mentioned. From a physical perspective, interview participants noted the concerns associated with fragmentation of the landscape (CE1, CE2). Articles discussed the lack of connectivity between humans their landscape from a knowledge perspective (Brown et al. 2000; Thompson 2004) and how human development decreases connectivity in ecological systems (Botequilha Leitão and Ahern 2002; Brown et al. 2000; Chace and Walsh 2006; Esbah, Cook, and Ewan 2009; Hansen et al. 2005; Luck and Wu 2002; Thompson 2004). Specific examples include the following statements:

> The relatively small impacts of numerous private property owners can add up to big environmental problems (Thompson 2004, Page 151, Coded as small contributions can add up to big environmental problems, Rank of 1).

> You certainly, I think the corridor systems that are being illustrated in GI area really what separates that out from suitability models, in that suitability models are great at highlighting areas of highest overlap or highest utility – but they don't really do a good job of showing how to connect those things together or by connecting them, that adds strength to some areas but disproportionately to others (GI2, Page 22, Coded as Concern: Planning does not connect open space types, Rank of 2).

> Today's city devours many of its closest valuable natural and cultural resources, impoverishing both the land and us (Forman 2008, Page 252, Coded as impacts of urbanization on natural resources, Rank of 2).

Within the discussion on the effects of human developments on species, three areas were discussed. The first of these points is the varying responses that species have to development and urbanization (Bryant 2006; Chace and Walsh 2006; Esbah, Cook, and Ewan 2009; Hansen et al. 2005; Miller et al. 2003; Odell and Knight 2001; Polasky et al. 2005; Riley et al. 2003; Stoms 2000). The second area mentioned include the disproportional effects development has on ecological systems as humans and species

both vie for critical lands, e.g., riparian areas and public lands (Blair and Johnson 2008; Brody, Carrasco, and Highfield 2006; Esbah, Cook, and Ewan 2009; Hansen et al. 2005; Miller et al. 2003). Finally, in a cross-country study of the effects of urbanization on community composition (of species), Blair and Johnson (2008) found the following:

> Instead, we see the same pattern of extirpation and invasion occurring in all regions…show that the sites become increasingly similar in community composition, not just structure, with increasing urbanization (Blair and Johnson 2008, Page 1166, Coded as Structure and composition become similar with increased urbanization, Rank of 1 for the first statement, Rank of 2 for the second portion of the statement).

Humans and Society

Six interview participants and thirty-one articles have coding mentions within this subcategory. Of the one hundred twenty-five coding mentions, an overall ranking average of 2.5 was assigned to this subcategory using the Likert scale metric results. Median rankings within this subcategory were 1.5 for the CEDAR participants, 1.8 for the Green Infrastructure participants, and 2.4 for the literature, with an overall average median of 2.3. For the Mann Whitney *U* test within this subcategory, the groups differed significantly (Mann–Whitney $U = 44.0$, $n = 37$, $P = 0.029$ two-tailed).

Two general areas were discussed within this subcategory: development patterns and health effects. Development pattern coding mentions included topics such as open space loss (CE1, CE5; Odell and Knight 2001; Esbah, Cook, and Ewan 2009; Solecki and Oliveri 2004), the socioeconomic effects of the existing development patterns (Day 2006; Nelson 2006; Troy et al. 2007), the effects of sprawl (GI1; Bengston, Fletcher, and Nelson 2004; Brody, Carrasco, and Highfield 2006; Bryant 2006; Daniels and Lapping 2005; Downs 2005; Jabareen 2006; Lee and Moudon 2004; Solecki and Oliveri 2004;

Talen and Knapp 2003), and changing population trends (Hansen et al. 2005; Nelson 2006).

Nelson (2006) notes the lack of resilience that our suburban landscapes currently possess:

> …have shown that outer suburbs undergo a similar cycle, yet may be less resilient and more resistant to renewal than central cities… (Nelson 2006, Page 401, Coded as suburbs less resilient, Rank of 2).

Additional examples include the following statements:

> And, uh, so I think that's a strength, instead of, a lot of times it seems like development just happens randomly and it's all about whoever owns the land and it can happen randomly and you just fill up the valley with as many rooftops as is allowed by code. But in so doing, you destroy the very values that made it so special for the previous generation. And it really seems to deteriorate, and so, I think it's a pretty proactive process to, to really bring attention to what will happen with development if we have x number of rooftops and they are all spread out and there's no density, then uh, the workshops themselves make it pretty clear that all those cultural assets, if you want everybody to have a trophy home in the valley, all those cultural assets will just vanish (CE5, Page 4, Coded as Concern: Development patterns destroy open space values, Rank of 1).

> Sprawl has been identified as America's leading land use problem, causing premature and excessive conversion of farmland, open space, and natural areas (Daniels and Lapping 2005, Page 317, Coded as Effects of Sprawl, Rank of 2).

In the health effects discussions coded within this subcategory, two main themes arose: the lack of social equity in health effects (GI7; Cohen, Inagami, and Finch 2008; Cutchin 2007; Day 2006; McMillan 2005; Vandegrift and Yoked 2004) and the effects that sprawl has on physical activity (Vandegrift and Yoked 2004). In addition to these topics, Kuo (2001) asks whether the problems related to health effects are really the problems of the people, or if they are problems with the place:

> This study contributes to our understanding of these phenomena by suggesting a different focus and a different diagnosis. That is, perhaps the pathology is in the place, not the people (Kuo 2001, Page 29, Coded as pathology may be in the place, not the people, Rank of 2).

**Category: Disconnect**

Coding mentions in the Disconnect category were split almost equally between the interviews and the literature (total of one hundred twenty-four comments, fifty-five from the interviews and sixty-nine from the literature). Two subcategories arose from the data – (1) Cultural Norms and Individual Behaviors and (2) Planning and Policies. These subcategories highlight the disconnects that are seen as pressures inhibiting more integrated forms of open space planning, either from the perspective of the social realm (cultural norms and individual behaviors) or the planning and political realm (planning and policies).

Cultural Norms and Individual Behaviors

Thirteen interview participants and twelve articles have coding mentions within this subcategory. With fifty-eight coding mentions, the median rankings within this subcategory were 2.0 for the CEDAR participants, 2.4 for the Green Infrastructure participants, and 2.3 for the literature, with an overall average median of 2.3. The distributions within the groups did not differ significantly (Mann–Whitney $U = 64.5$, $n = 24$, $P = 0.650$ two-tailed).Two general areas were discussed within this subcategory: cultural models and norms and individual behaviors.

In the cultural norms discussion, two ideas arose from the data. First, interview participants (CE1, CE4, CE5) noted the conflicts between private property rights and integrated open space planning efforts, highlighting notions of equity in open space planning efforts and that planning today does not go beyond individual properties. The second theme is focused on the insufficient nature of the cultural models we currently

employ to help move us toward landscape integrity (Forman 2008; Thompson 2004). Specific examples include the following statements:

> And that's where either the elected officials or the property owners are taking action, and with private property rights – that has become such a bitter issue in this state, and in the Intermountain West I think, it begs the question of okay, so here's a great model, but beyond being entrusting procedure to go through at the end of the day, what does it do? How does it help? And I'm not sure it does; I'm not sure that people that are looking at their ranches that are no longer viable, and they can sell it off to all these people that want to put a trophy home on those old fields – it seems like a good short-term solution for those individuals, even though it completely deteriorates the community itself and what they value about it. I don't know – that's pretty complicated, how you actually put the teeth into it or make it take the next step (CE5, Page 6, Coded as Concern: private property rights, Rank of 2).

> Similarly, when we rely too heavily on the nature is our cultural history model, we risk idealizing nature as a lost past and making it seem irrelevant to daily behavior (Thompson 2004, Page 148, Coded as Problems with idealizing nature and making it irrelevant, Rank of 2).

Planning and Policies

Eight interview participants and thirteen articles have coding mentions within this subcategory. With sixty-six coding mentions, median rankings within this subcategory were 1.6 for the CEDAR participants, 1.5 for the Green Infrastructure participants, and 1.8 for the literature, and an overall, average median of 1.7. The distributions within the groups did not differ significantly (Mann–Whitney $U = 37.5$, $n = 21$, $P = 0.222$ two-tailed).

Two general areas were discussed within this subcategory: the disconnect between policies and open space values and the reactive nature of planning. In the discussion regarding the disconnect between policies and open space values, participants and the literature expressed concern that existing policies were insufficient to meet open space needs (CE1, CE2, CE3, CE5, GI1, GI3, GI8, GI9; Brody, Carrasco, and Highfield

2006; Conway and Lathrop 2005; Merenlender et al. 2004). One interviewee (CE3) and several articles noted the lack of systems thinking or strategic planning within existing policies (Conway and Lathrop 2005; Daniels and Lapping 2005; Downs 2005; Jepson 2004; Talen and Knapp 2003). Specific statements include the following:

> And, then, managing it to the standard, which many open spaces that have been acquired, which most of the open spaces that have been acquired in Utah have never had conservation easements or management plans because they really weren't acquired strategically (CE3, Page 3, Coded as Concern: Open space lands not acquired strategically, Rank of 1).

> But institutions and policies developed primarily in the western public domain do not necessarily meet today's conservation needs (Merenlender et al. 2004, Page 66, Coded as Policies do not meet conservation needs, Rank of 2).

This notion of a disconnect between policies and open space values was reinforced by the second topic area – the reactive nature of planning. One overarching concern that was noted within this section was that while sprawl is seen as a regional problem (Brody, Carrasco, and Highfield 2006), many jurisdictions are unwilling to relinquish power to other governance levels, unless in a state of crisis or under threats (CE1, CE3; Downs 2005). Additional comments include low levels of public interest in addressing sprawl (Jepson 2004), and the lack of commanding influence that planners have in today's world (GI1; Berke 2001).

> The few American regions that have shifted significant land use planning power from local to regional bodies have done so primarily as the result of some situation perceived to be a crisis at the state level (Downs 2005, Page 370, Coded as Shifts in power only occur in times of crises, Rank of 4).

> Most places we worked it was already too late to protect things that were highly developable, because they were already owned by developers, or already adoptions by developers, we never really worked in places that were truly rural or farmland that had a chance to do it still (CE3, Page 9, Coded as Concern: open space planning process too late, Rank of 1).

## Summary of the Inhibiting Pressures Toward Integrated Open Space Planning

These categories highlight the inhibitive pressures the built environment and disconnect (policies and societal norms) place on the movement toward more integrated forms of open space planning. Not surprisingly, due to the abundant number of concerns indicated by all participants (except GI8, see note above), both of these categories have the lowest Likert metric scale rankings, indicating a general concern with these pressures.

## Pressures Facilitating Integrated Open Space Planning: Shifting Perspectives

The Shifting Perspectives category is composed of two subcategories: Paradigm Shifts and Changing Landscapes – Human and Ecological. As discussed in the summary of this category, these facilitating pressures highlight a shift in perspectives based on fundamental shifts in the way the world is perceived (Paradigm Shifts subcategory) and the rapidly changing landscapes in which we live (Changing Landscapes subcategory). A summary of the total coding mentions for each of these subcategories can be seen in Figure 9; a summary of the means from each participant group can be seen in Figure 10.

### Changing Landscapes- Human and Ecological

Nine interview participants and twenty-one articles have coding mentions within this subcategory. With eighty-seven coding mentions, the median rankings within this subcategory were 2.6 for the CEDAR participants, 3.0 for the Green Infrastructure participants, and 3.1 for the literature, with an overall average median of 3.0. The distributions within the groups did not differ significantly (Mann–Whitney $U = 81.0$, $n = 31$, $P = 0.428$ two-tailed). Areas of discussion within this subcategory generally covered the following areas: growth and development (Brown et al. 2005; Carter and

Fowler 2008; Conway and Lathrop 2005; Esbah, Cook, and Ewan 2009; Hansen et al. 2005; Odell and Knight 2001; Zipperer et al. 2000) and land use changes (CE1, CE5; Blair and Johnson 2008; Bowman, Thompson, and Colletti 2009; Bryant 2006; Conway and Lathrop 2005; Forman 2008; Jantz, Goetz, and Jantz 2005; Solecki and Oliveri 2004).

Additional comments included changing housing needs (GI7, Nelson 2006), climate change (GI2, GI7; Solecki and Oliveri 2004). Concerns included planning for a static world (GI2) and views of change as weakness (GI2). Specific comments within this subcategory include the following:

> The needs of a society dominated by childless households, a growing share of which have only one person, will be different than those of the mid-20th century, when households with children were in the majority (Nelson 2006, Page 394, Coded as Changing household needs, Rank of 3).

> Species richness was related to age of development, with bird species richness continuing to decrease more than 60 years after development (Hansen et al. 2005, Page 1896, Coded as Longer-term development effects on biodiversity, Rank of 2).

> I would say probably another area, but one which is still included in that caveat that holds true, is climate change. You know, the whole conservation community is a little on edge these days because you know, pretty much a lot of our conservation planning in the past has been planning for a static world (GI2, Page 12, Coded as Planning for a Static World, Rank of 1).

Paradigm Shifts

Nine interview participants and twenty-one articles have coding mentions within this subcategory. With thirty-five coding mentions, the median rankings within this subcategory were 3.8 for the Green Infrastructure participants and 3.7 for the literature, with an overall average median of 3.7 (note that CEDAR participants did not have any coding mentions within this subcategory). The distributions within the groups did not

differ significantly (Mann–Whitney $U = 29.5$, $n = 18$, $P = 0.736$ two-tailed). Within the interviews, this subcategory was discussed in the frame of Green Infrastructure becoming a nationwide concept (GI2, GI6) and the notion of paradigm shifts overall (GI7, GI9). Within the literature, authors discussed the shifting notion of place from the physical environment to place as process (Cutchin 2007; Lee and Moudon 2004), the shifting public perception (Botequilha Leitão and Ahern 2002; Haight, Snyder, and Revellet 2005; Luck and Wu 2002), and the need for new roles in planning, whether more optimism (Mayer et al. 2009) or the need for better ways to frame the issues (Nelson 2006; Thompson 2004).

One additional area mentioned by one interviewee (GI7) and four articles (Botequilha Leitão and Ahern 2002; Daniels and Lapping 2005; Jabareen 2006; Nelson 2006) is the notion of timing, specifically the sense of urgency to address these issues. Specific examples include the following:

> Another thing is that we're doing a lot of planning processes and doing these Green Infrastructure courses in states and regions that I would have never dreamed of in a million years that we'd be doing and would be interested in GI. You know we did multiple Green Infrastructure trainings in Alaska! Alaska has a gazillion tons of public lands; they don't have a lot of private lands. Last February we did a weeklong training in Fairbanks Alaska, and that's also surrounded by public lands. And it's a very conservative part of the country, very resource-extraction oriented, you know, not the sort of place that I would have envisioned being open and actively seeking Green Infrastructure (GI2, Page 26, Coded as Green Infrastructure is a nationwide concept, Rank of 4).

> And, uh, I think one of the challenges over time has been, and it's a real opportunity, I think the design community is really undergoing a real shift in terms of how folks think about design in terms of what role Green Infrastructure plays in the design process. I mean, conventionally, it was just absent; but it's not anymore. It's very much in folks' minds, and um, that's good thing (GI7, Page 18, Coded as Paradigm Shifts, Rank of 4).

> The remarkable growth in the number of state and local referenda on smart growth…indicates a surge in anxiety about the impacts of sprawl (Bengston,

> Fletcher, and Nelson 2004, Page 272, Coded as Increase in local referenda on smart growth, Rank of 4).
>
> Finally, an issue prevalent in much of the land preservation literature is a sense of urgency (Daniels and Lapping 2005, Page 326, Coded as Sense of urgency, Rank of 4).

**Summary of Bridging the Gap Core Category**

The Bridging the Gap core category highlights two important processes: paradigm shifts and changing landscapes. Authors and interview participants saw the notion of a paradigm shift as both a process, as in the example of the shifting perspectives of the design community, and a state, how people currently are planning in more integrated manners. The Changing Landscapes – Human and Ecological subcategory discusses ideas and concerns that could serve as the impetus for a paradigm shift to occur. Both of these subcategories serve us well as we launch into the next core category: Open Space Paradigm.

Core Category: Open Space Paradigm

The core category "Open Space Paradigm" arose from three categories: Engage, Illustrate, Commit, and comprised the majority of the coding mentions within this study (n = 2,804). This core category highlights the Open Space Paradigm in which the interview practitioners function and the literature illustrates. Due to the large number of subcategories within each category (Engage, n = 10; Illustrate, n = 11; Commit, n = 5), summaries of the coding mentions and average medians for each participant group will be placed within each subcategory's discussion.

**Category: Engage**

The category Engage has ten subcategories that arose from the data. Six hundred twenty-three coding mentions were categorized into these ten subcategories, with an additional eleven topic areas supporting the subcategories. Figures 12 and 13 show the number of coding mentions and average median rankings from the Likert Scale metric for each subcategory. This category illustrates the comments interviewees and the literature made relating to the need to engage participants, each other, and the public in the planning process. The ten subcategories are discussed below, with a summary at the end of this section that identifies cross-category topics.

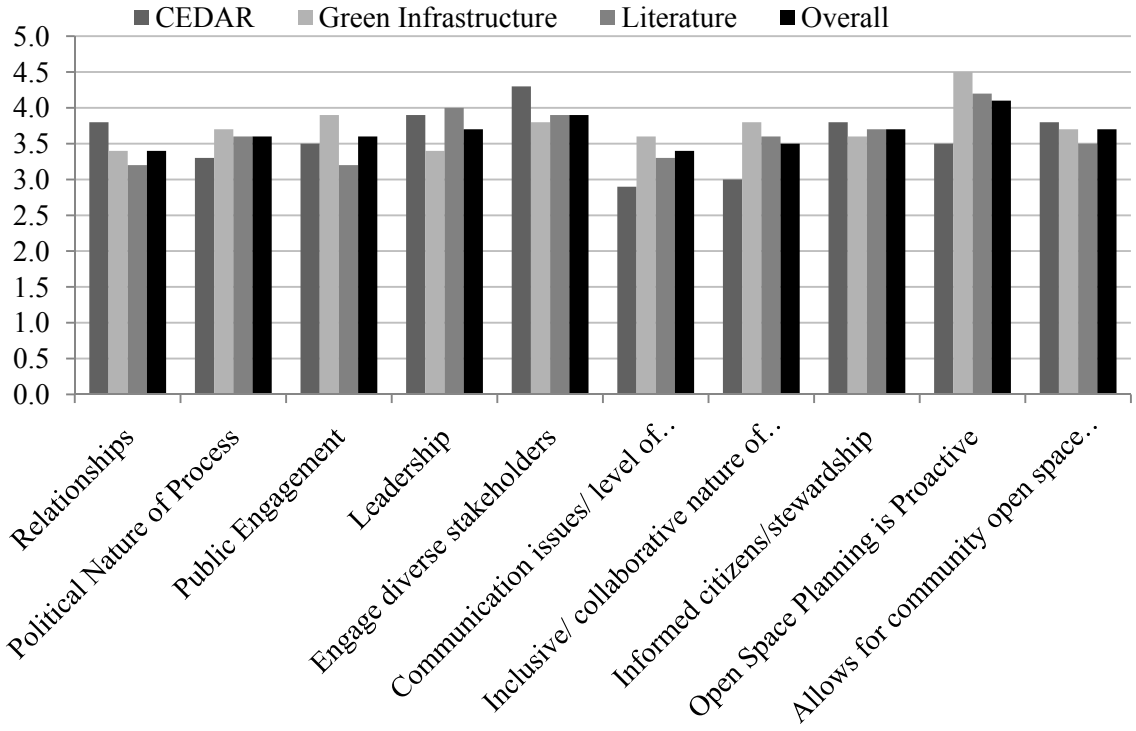
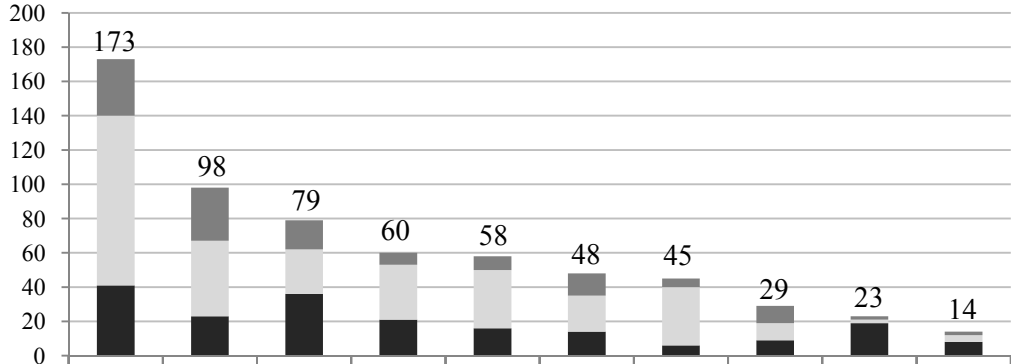



Figure 12: Coding mentions by the participant groups, categorized by category and subcategory for the category Engage. Data labels on top of each column indicate the total coding mentions for each subcategory.




| | Engage | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Rela-tion-ships* | Political Nature of Process | Public Engage-ment | Leader-ship | Engage diverse stake-holders | Com-munica-tion issues/ level of engagem ent | Inclu-sive/ collab-orative nature of process | In-formed citizens/ steward-ship | Open Space Plan-ning is Pro-active | Allows for com-munity open space vision to be devel-oped |
| Literature | 33 | 31 | 17 | 7 | 8 | 13 | 5 | 10 | 2 | 2 |
| Green Infrastructure | 99 | 44 | 26 | 32 | 34 | 21 | 34 | 10 | 2 | 4 |
| CEDAR | 41 | 23 | 36 | 21 | 16 | 14 | 6 | 9 | 19 | 8 |

Figure 13: Average median rankings of the varying participant groups by subcategory for the category Engage.

Allows for Community Open Space Vision
to be Developed

With fourteen coding mentions, the median rankings within this subcategory were 3.8 for the CEDAR participants, 3.7 for the Green Infrastructure participants, and 3.5 for the literature, with an overall average median of 3.7. The distributions within the groups did not differ significantly (Mann–Whitney $U = 2.5$, $n = 7$, $P = 0.797$ two-tailed). Of the six interviewees (CE1, CE2, CE5, GI2, GI3, GI4) and one article (Berke 2002) that discussed this subcategory, most discussed how their process allowed a community to develop a shared vision of what their open space system could be. For example, CEDAR participant CE1 discussed how the CEDAR methodology leads to an understanding of the community's value system:

> The CEDAR methodology leads to an understanding of a community's value system; within that community value system, you see when and where are the valued spaces. (CE1, Page 17, Coded as "Fosters knowledge of community's value system," Rank of 3).

Communication Issues/Levels of Engagement

Thirteen of the fourteen interview participants and six articles have coding mentions within this subcategory. With forty-eight coding mentions, the median rankings within this subcategory were 2.9 for the CEDAR participants, 3.6 for the Green Infrastructure participants, and 3.3 for the literature, with an overall average median of 3.4. The distributions within the groups did not differ significantly (Mann–Whitney $U = 36.5$, $n = 19$, $P = 0.822$ two-tailed). Many participants and the literature indicated that communication occurs every day and occurs across all political levels (CE1, CE2, GI2, GI4, GI8, GI9; Cutchin 2007; Botequilha Leitão and Ahern 2002; Sagalyn 2007). Green Infrastructure participant GI9 indicated her heavy level of involvement at all levels in this statement:

> I mean, I'm the Executive Director of the coalition. So, in that sense, we have to be very involved and very, have a lot of communication going back and forth between all of our members. (GI9, Page 6, Coded as "Communications," Rank of 5).

In addition to the general area of everyday communication needs, multiple participants indicated the need for messaging and marketing in the open space planning process. One example is the following statement from participant GI5:

> I would certainly advise everybody to think hard about marshalling marketing efforts; I think that's really important and to, um, to keep track of polling and surveying very carefully so that you don't lose track of what normal citizens are thinking. (GI5, Page 20, Coded as Messaging/PR, Rank of 4).

Engage Diverse Stakeholders

With fifty-eight coding mentions, the median rankings within this subcategory were 4.3 for the CEDAR participants, 3.8 for the Green Infrastructure participants, and 3.5 for the literature, with an overall average median of 3.9. The distributions within the groups did not differ significantly (Mann–Whitney $U = 26.0$, $n = 16$, $P = 0.861$ two-tailed). Eleven of the fourteen interview participants and five articles made mention of the need to engage diverse stakeholders within the planning process. Those who saw stakeholders as a strength to the process (thirty-eight out of the fifty-eight responses were ranked at a 4 or 5) indicated the need to get stakeholders involved early, the need for meaningful participation, and to get multiple types of stakeholders involved in the process. Specific examples include the following:

> I think getting the right people involved from the beginning in leading the project increases odds of implementation" (CE4, Page 10, Coded as "Engage stakeholders early," Rank of 4).

> Finally, meaningful and informed stakeholder and public participation is viewed as a most important dimension in a sustainable landscape planning process. (Botequilha Leitão and Ahern 2002, Page 80, Coded as "Meaningful stakeholder engagement," Rank of 5).

While diverse stakeholder engagement was always a goal of those who mentioned this category, full participation is not always a reality. One example comes from Green Infrastructure participant GI3:

> I mean the one thing that was sort of missing was the landowner contingent didn't really show up – I mean there were a couple of them, certainly the stuff was in the appear, but it wasn't, we weren't exactly reaching out, I mean not intentionally, because that is the, as I was saying before you know private land ownership in Texas is a huge deal and certainly something you're sensitive to any time you do a plan like this. It was almost that the scale of this was not so specific that…that it was going to affect so and so's land, but not...not a big private land contingent involved, which is not because we didn't want them to be, it's just because they

> weren't (GI3, Page 12, Coded as "Concern: Lack of development/landowner participation," Rank of 2).

Inclusive/Collaborative Nature of Process

With forty-five coding mentions within this subcategory, the median rankings were 3.0 for the CEDAR participants, 3.8 for the Green Infrastructure participants, and 3.6 for the literature, with an overall average median of 3.9. The CEDAR participants median ranking was significantly different from the Green Infrastructure participants (Mann–Whitney $U = 10.0$, $n = 10$, $P = 0.014$ two-tailed) and the literature (Mann–Whitney $U = 2.0$, $n = 8$, $P = 0.046$ two-tailed). However, an overall comparison of the median rankings between the literature and interview participants did not reveal the rankings to be statistically different (Mann–Whitney $U = 17.5$, $n = 14$, $P = 0.693$ two-tailed).

Ten of the fourteen interview participants and four articles discussed topics that have been coded under the subcategory "Inclusive/Collaborative Nature of Process." Several GI participants mentioned seeing themselves in the collaborative process as conveners or facilitators (notably GI5, GI7, GI8). An additional strength identified in this subcategory includes allowing everyone to participate (CE1, CE3, CE4, CE5, GI2, GI3, GI5, GI6, GI7, GI8). One example comes from participant CE5:

> I think the, uh, the strengths, again, begins by allowing everybody to participate in the conversation and put on paper what they feel is special about their community, so almost by definition or the process itself, the only way people show up at these workshops is if they care about their community – otherwise you wouldn't show up. (CE5, Page 3, Coded as "inclusive process," Rank of 3).

One weakness that was noted was the amount of time it takes to work through the collaborative process and limits to the partnership (GI5):

> Well, yes. It's um, the collaborative approach relies on people taking time to participate and someone still has to be paid to do the work. That's one of the things that is on our mind, because people can join together to say, prioritize and to do certain amounts of work, but if it's not part of their job description or they don't have funding to do it, you're going to have limited traction to do it. (GI5, Page 10, Coded as Concern: Collaborative process takes time and labor, Rank of 2).

One additional topic that was only mentioned in the literature (Armstrong 2000; Berke 2002; Day 2006) was on how the built environment and open space can address the pressing health and social equity society. In her study on community gardens Armstrong (2000) saw these venues (community gardens) as being inclusive to all individuals, regardless of race. Additionally, Day (2006) saw the connections between the built environment, health effects, and equity in her study entitled "Active living and social justice: Planning for physical activity in low-income, Black, and Latino communities." The following excerpt highlights her argument:

> Taken together, this information suggests that initiatives to prevent and reduce overweight and obesity should place particular emphasis on poor, Black, and Latino communities (Day 2006, Page 90, Coded as Need for a focus on more equitable planning, Rank of 4).

Informed Citizens/Stewardship

Six interview participants and six articles discussed topics that have been coded under the subcategory "Informed Citizens/Stewardship." With twenty-nine coding mentions within this subcategory, the median rankings were 3.8 for the CEDAR participants, 3.6 for the Green Infrastructure participants, and 3.7 for the literature, with an overall average median of 3.7. The distributions within the groups did not differ significantly (Mann–Whitney $U = 18.0$, $n = 12$, $P = 1.000$ two-tailed). There was a general sense amongst participants and the literature that increasing understanding among

citizens led to increased stewardship. One participant (CE1) saw increased stewardship as a way to reduce environmental loss, when he notes:

> And, if you understand it, you value it, and you appreciate it and you become more connected it to it. And that will, hopefully down the road, will lead to more environmental concern and (less) loss of our natural landscape. (CE1, Page 36, Coded as informed citizens/stewardship, Rank of 4).

Brody, Carrasco, and Highfield (2006) discovered that increased education could lead to a greater sense of stewardship. They note:

> Jurisdictions with higher levels of education adopt significantly more sprawl-mitigation policies in their comprehensive plans (Brody, Carrasco, and Highfield 2006, Page 306, coded as increased education equals increased stewardship, Rank of 4).

In addition to the ideas discussed above, two topic areas were derived from this subcategory: Sense of Place and Science Informs. Three interviewees (CE1, CE4, GI7) and four articles (Armstrong 2000; Kim and Kaplan 2004; Krenichyn 2006; Rodriguez, Khattak, and Evenson 2006) discussed the relationship between informed citizens and sense of place, Only one weakness was noted in this topic area, where the lack of iconic landscapes was considered to play a role in the lack of advocates for the area's efforts (GI7). Otherwise, participants saw an increased understanding of place was considered important (CE4) and potentially related to the built environment (Armstrong 2000; Kim and Kaplan 2004; Krenichyn 2006; Rodriguez, Khattak, and Evenson 2006). For example, Rodriguez, Khattak, and Evenson (2006) note:

> The fact that residents of New Urbanist neighborhoods spend more time being physically active in their neighborhoods indicates a possible explanation for claims of a stronger sense of community and higher neighborhood cohesion documented elsewhere. (Rodriguez, Khattak, and Evenson 2006, Page 52, coded as more activity in neighborhood may equal greater sense of community, Rank of 3).

Three interviewees noted the role of science in creating informed citizens (CE4, GI7, GI8). In one of the member checking processes (see page 51 for a discussion on this measurement of validity), participant GI8 clarified a response held during the interview, where this researcher and the participant discussed a controversy between the environmental organizations on her board and the U.S. Forest Service. In our conversation, she highlighted the role of science in handling the situation and providing education to citizens who might have positions based more on values than science:

> [We invited] University and Forestry people to talk about modern ways of thinning and that the US Forest Service is, um adhering to those. We can have loads that are commissioned or decommissioned within the forest. I think the environmental people who were really concerned about this didn't get persuaded completely, but they heard enough to realize that we had bigger environmental issues going on than that one, and let's focus our efforts there. (GI8, Page 23, Coded as Role of science in creating informed citizens, Rank of 3).

Leadership

This subcategory was thoroughly discussed within the interviews and much less in the literature (fifty-three out of the sixty coding mentions were from the interviews). The median rankings were 3.5 for the CEDAR participants, 3.4 for the Green Infrastructure participants, and 4.0 for the literature, with an overall average median of 3.7. The distributions within the groups did not differ significantly (Mann–Whitney $U = 15.5$, $n = 17$, $P = 0.212$ two-tailed). Both of the concerns expressed regarding leadership were expressed during one interview (GI7), where a lack of leadership was noted when the interviewee mentioned:

> And here, those issues, there isn't anybody in a leadership role that sort of has created a little bit of a vacuum which has then created an opportunity for a group like mine to try and to vision a GI model through the regional planning processes that we oversee to try and advance this agenda and to align that agenda with related processes that might be happening at other scales, whether it's local or

> federal. (GI7, Page 5, Coded as Concern: lack of leadership in conservation planning, Rank of 2).

Note, however, that this participant also saw this as an opportunity for his organization to become a leader in the conservation planning arena.

Two topic areas arose from this subcategory: Project Champion and Steering Committee. Fourteen of the seventeen mentions of the topic Project Champion were made during the interviews, where the participants described the role of a project champion as follows:

> Absolutely. We, you know, early on in looking at a community, there are certain indicators that we have to have or we literally don't go into a community and do the work. So, there has to be a champion. (CE2, Page 13, coded as Project Champion critical to success, Rank of 5).

> We were always saying we were looking for champions to take the plan forward. (CE3, Page 10, Coded as Project Champion, Rank of 5).

While many used the term steering committee to describe their project's leadership (CE1, CE2, CE4, CE5, GI1, GI4, GI5, GI9), various other terms were used as well, including technical review committees (GI2), Advisory Group (Bryant 2006), leadership forum (GI2), technical advisory committee (GI6), board of directors (Sagalyn 2007). From a descriptive standpoint, steering committees were mentioned in two ways: (1) as a sounding board for what the consultant or planners were developing (CE1, CE2, CE5, GI2, GI5, GI6), and (2) as the project's guidance from a political standpoint, whether this meant to increase a project's likelihood of success or inform the planners of political nuances within their community (CE2, CE4; Sagalyn 2007).

> Throughout this whole exercise we do provide information to our leadership forum for their review, for their critique, for their adjustment as well as the technical review team and so we do make modifications, um, and adjust based on the feedback that we get from our various stakeholder groups. (GI2, Page 8, Coded as leadership forum involvement, Rank of 3).

> That would include the local elected officials and decision makers that have to trust you and trust the process and be willing to take action on it at the end of the day. (CE4, Page 3, Coded as "leadership that understands political context," Rank of 3).

Open Space Planning Is Proactive

While this category received few mentions (n=19), the feelings that were expressed about the need for open space planning to be proactive were both strong and positive, given its median rankings were 3.5 for the CEDAR participants, 4.5 for the Green Infrastructure participants, and 4.2 for the literature, with an overall average median of 4.1. The distributions within the groups did not differ significantly (Mann–Whitney $U = 8.0$, $n = 10$, $P = 0.542$ two-tailed). Only three interviewees mentioned this category (CE3, CE5, GI2), and seven articles mentioned this topic (Botequilha Leitão and Ahern 2002; Brody, Carrasco, and Highfield 2006; Conway and Lathrop 2005; Daniels and Lapping 2005; Sagalyn 2007; Solecki and Oliveri 2004; Thompson 2004). One interviewee (GI2) discussed proactive planning as a tool to protect ecological health:

> You know we need to be proactive in planning for our, kind of, ecological health and making sure we have integrated systems (GI2, Page 3, Coded as Open Space Planning is Proactive, Rank 5).

In the literature, open space planning was seen as a solution to the more traditional state of planning as reactive (see subcategory Planning and Polices, under the core category Pressures, for further discussion on this issue), as well as a way to promote ecological change and a more sustainable built environment. Specific mentions are as follows:

> A more proactive attitude in planning is advocated in order to anticipate consequences on ecological systems before they actually take place (Botequilha Leitão and Ahern 2002, page 79, Coded as Need for proactive attitude, Rank 4).

> The challenge for planning organizations, however, will be to anticipate future rapid growth and fortify planning staffs accordingly before sprawl takes place (Brody, Carrasco, and Highfield 2006, Coded as Proactive planning, Rank of 3).

Political Nature of Process

Thirteen of the fourteen interviewees and twelve articles had coding mentions that were classified into this subcategory, with median rankings at 3.3 for the CEDAR participants, 3.7 for the Green Infrastructure participants, 3.6 for the literature, and an overall average median of 3.6. The distributions within the groups did not differ significantly (Mann–Whitney $U = 76.0$, $n = 25$, $P = 0.908$ two-tailed). The overriding comments in this category were the need to engage political leaders in the process, the changing political winds that occur in these processes, and the need for policies to follow the planning process. CE2 noted that implications of the different timing between their open space planning process and the short-term nature of American politics:

> So one of the failings of all this is that these projects can easily take a year , and sometimes two, and so that span of time leaves a process vulnerable to, um, changing politics, changing points-of-views, um, people entering into the process at different points in time, and it's really difficult to manage all of those things. So although I'd like to get through a process quicker, but the fastest one I've ever done was 45 days, and it had its own challenges, but the, it takes so much time to, you know, it can lose momentum, and things can start to interfere with it and we have to be very careful with the real estate development community (CE2, Page 18, coded as Concern: changing political winds, Rank of 1).

GI1 discussed the political nature of the process as inhibiting him from implementing a more comprehensive planning effort when he stated:

> I understand green infrastructure, but my small community politics won't allow me to implement an overarching plan – I have to prioritize (GI1, Page 4, Coded as Concern: politics limit implementation, Rank of 1).

GI5 discussed the need for policies to follow the planning process in this statement:

> And, this is important because a lot of funding and prioritization has something to do with a policy somewhere along the lines (GI5, Page 4, coded as Green Infrastructure is only Green Infrastructure when it is based on policy, Rank of 4).

In addition, Jabareen (2006) argued that the focus on planning for the built form may be a misguided planning process:

> It is remarkable that the core of many approaches is the *management* of the city, rather than the suggesting of any specific urban form; it is believed that not the physical shape of the city and its built environment that is important; it is how the urban society is organized and managed that counts most (Jabareen 2006, emphasis in original, Page 47, Coded as Process over form, Rank of 4).

Additional comments in this subcategory included the notions of power and willing communities. Seven authors or interviewees mentioned power within their article or interview (CE1, CE2, CE3, GI9; Armstrong 2000; Cutchin 2007; Downs 2005). When power was spoken of positively, the interviewees or authors discussed power as a "level" playing field (CE1, CE2), an increased understanding of how to balance power (Cutchin 2007), or how a group has gained power by speaking from a unified voice (GI9). When spoken of negatively, power was seen as groups lacking power (GI9), that the public does not know their own power (CE1, CE3, GI9; Cutchin 2007), or a hesitancy to share power (Downs 2005).

Thirteen coding mentions discussed willing communities, all from the interviews (CE1, CE2, CE3, GI2, GI3). These participants noted the importance of willing communities for engaging in an open space planning process. Willing communities were discussed in two ways (1) as communities needing to be ready before a consultant would conduct their process (CE1, CE2, GI2, GI3) or as the community being the one to initiate the planning process (CE3). An example of this statement is as follows:

> Yes, so I think you have to create that consistency in a community and you have to develop ways and means to, um, do census in that community to make sure that they know that that's what they need to do at the end of the day and if you can get

> any kind of no's to those questions early on, you've got to push them or say thanks, but no thanks call me when you're ready (CE2, Page 33, Coded as Work with a community when they are ready, Rank of 5).

Public Engagement

Differing from the "Engage Diverse Stakeholders" subcategory in that this subcategory includes a broader, public-oriented discussion, this subcategory had median rankings at 3.5 for the CEDAR participants, 3.9 for the Green Infrastructure participants, 3.2 for the literature, and an overall average median of 3.6. The distributions within the groups did not differ significantly (Mann–Whitney $U = 35.5$, $n = 21$, $P = 0.297$ two-tailed). Twelve of the fourteen interviewees mentioned public engagement and public participation (considered as one in this analysis) as critical to the planning process. Additional comments about the public engagement process included the need to value participants in the process (CE1, CE2, CE3, CE4, GI5, GI8), the stigma associated with not participating, i.e., looked upon negatively for not participating in the process (CE1; Regan, Colyvan, and Markovchick-Nicholls 2006), and that public engagement can lead to community empowerment (Berke 2001; Botequilha Leitão and Ahern 2002; see also subcategory Informed Citizens/Stewardship).

CE3 noted how critical allowing participants to be heard is in the following statement,

> And, one of the, I've just encountered tons of models over time now, different approaches to public planning and public land planning. And, one of the things I've learned about getting the public involved is that they all have to see themselves in the process; this does help them see whatever their interest is that they have a piece of open space (CE3, Page 4, Coded as Genuine Public Engagement, Rank of 5).

In addition, several authors noted that public engagement can lead to community empowerment. Berke (2002) highlights this notion in his discussion on the advocacy planning field of the planning profession:

> Advocacy planners fostered extensive community participation not only to create plans that meet the needs of the underrepresented but also to empower them (Berke 2002, Page 23, Coded as Community engagement for empowerment, Rank of 3).

Relationships

Of the one hundred seventy-three mentions in this subcategory, one hundred forty were from the interviews (forty-one from CEDAR and ninety-nine from Green Infrastructure) and thirty-three from the literature. Median rankings for this subcategory were 3.8 for the CEDAR participants, 3.4 for the Green Infrastructure participants, 3.2 for the literature, and an overall average median of 3.4. The distributions within the overall group comparison did not differ significantly (Mann–Whitney $U = 44.0$, $n = 24$, $P = 0.096$ two-tailed), but the CEDAR participants rankings did significantly differ from the literature (Mann–Whitney $U = 44.0$, $n = 24$, $P = 0.096$ two-tailed).

Four areas of interest were discussed within the subcategory, how relationships are critical to success, the role of partners and mentors, social and research connections, and relationships with the community. Several interviewees mention the critical nature of relationships to their success (CE1, CE2, GI7, GI9). When discussing which relationships are critical, GI9 notes:

> Just about all the relationships I think, between obviously our coalition members, between the people who are in charge of policy making, policies that we are attempting to affect, but then also the various stakeholders, I don't think we could be effective without building relationships with, and making alliances with those that are on different sides of the various issues (GI9, Page 7, Coded as Relationships are Key, Rank of 5).

In discussing the partners and mentors, coding mentions identified mentors each planning process or planner has had as well as partners in their current efforts. From a mentoring standpoint, five individuals/organizations were mentioned by multiple individuals as being important: Envision Utah (n=8), Land Trusts (n=8), Ian McHarg (n=6), Trust for Public Lands (n=4), and Aldo Leopold (n=2).

An additional facet of this topic is that when the interviewer asked the participants "who else does what you do the way you do it" (Question 1, Probe 1 of the Interviews), many participants responded that they didn't know who else did what they do. Or, some would indicate they didn't know or others were not as integrative as their organization. For example, GI5 states the following:

> Right now, I think that this region is potentially unique in that we're combining work of trails, parks, and natural areas together. Um, there are other urban, uh, conservation coalitions that do planning, um, at a regional scale. In our case, we're talking about twenty-six to thirty-five cities and four counties is our scale. And, there are a few other places that do work, but not very many. In fact, there are only a handful in the country (Page 2, Coded as Concern: No One is as Integrative, Rank of 2).

Another interviewee illustrating the same issue stated their responses a little more bluntly:

> Who else? We don't know of other places (GI8, Page 3, Coded as We don't know of others who are doing it this way, Rank of 2).

> Another respondent, GI3, stated a similar sentiment:

> I don't think anybody does really. The CF is, we're a national organization. We're kind of lean and mean and functioning behind the scenes to do these large landscape-level conservation projects (GI3, Page 2, Coded as Concern: Nobody else does what they do, Rank of 2).

While other interviewees mentioned there are similar organizations practicing similar work (GI2, GI7), the majority of respondents felt they were unique in their responses.

Eight of the fourteen interviewees highlighted relationships with the community within the interview (CE1, CE3, CE5, GI2, GI4, GI5, GI7, GI9). In this category, interviewees highlighted their relationships with the community and several mentioned empowering the community with the planning tools created during the process. An example of this topic area from the interviews include the following:

> You know, even though we're doing a GI plan – it's not our GI plan, it's not our vision – it's the client's vision, it's the leadership forum's vision for that area. So they set up the goals and you know, they also help us with our scientific assumptions (GI4, Page 6, Coded as Community Empowerment, Rank of 3).

This statement highlights that relationships go both ways – this interviewee creates the plan and the community creates the goals and provides feedback.

Nine of the fourteen interviewees (CE1, CE3, CE5, GI1, GI2, GI4, GI6, GI8, GI9) highlighted their organization or the model developer when responding to question to the interview questions, specifically Question 5, Probe 2 – "Who do you work with that is most central to your success?" Specific examples include the boss (GI1), model developer (CE1, CE3), staff (CE5, GI1, GI6, GI8, GI9), and the board (GI8).

Several interviewees (CE2, GI6, GI7, GI9) mentioned their social connections as helpful to their work. Additionally, other interviewees (CE1, GI2) highlighted their connections with the latest research as helpful to their work. As an example of social connections assisting the interviewees, CE2 made the following statement:

> So yeah, you have to have those personal relationships in a community. You can't go in and do this kind of work and be successful, in my view, without having those kind of connections. And you can't have, as a consultant, go into any community and just do a whole series of steps with regards to open space and its delineation and expect to have any success at all. So, if you don't make this societal-value connection through your personal contacts, contacts, or your workshops, you r likelihood of getting through a planning process that normally takes over 12 months to complete – the likelihood of success is virtually zero. You can't just view it from the outside, unemotionally or detached, and expect to

> be successful in this arena. It just doesn't happen (CE2, Page 13, Coded as Social Connections are critical, Rank of 5).

Summary of Engage Category

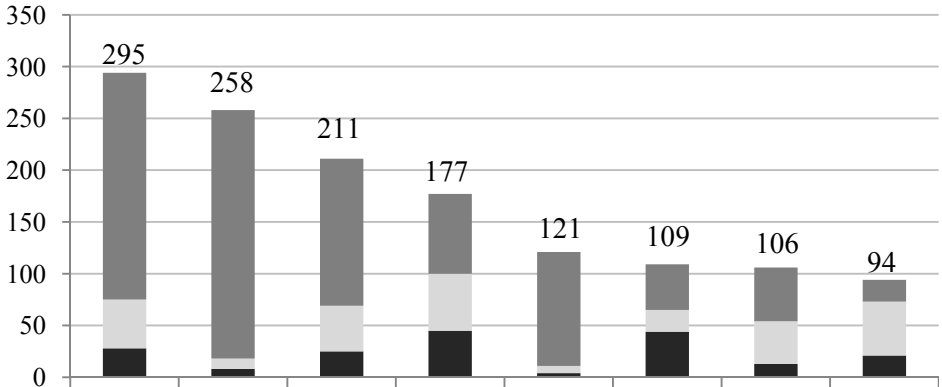
The Engage category highlights the importance of relationships and engagement within the open space planning process. Overall, the subcategories overall ranking averages (between 3 and 4) suggest these processes are either elements these planners or articles suggest be done or strongly encourage in a planning process. Once participants, stakeholders, and planners are engaged, they must next show the open space planning process, including analysis and implementation, works – not only from a theoretical perspective, but also from a practical perspective as we shall see in the next category: Illustrate.

**Category: Illustrate**

The category Illustrate has fourteen subcategories that arose from the data. One thousand, six hundred sixty-four coding mentions were categorized into these 14 subcategories. Figures 14 and 15 show the number of coding mentions and average mean from the Likert Scale metric for each subcategory. This category illustrates the comments the interviewees and literature made relating to the need to illustrate both processes and practices in the State (core category) of the Integrated Open Space Planning Framework that arose from the interviews and the literature. The fourteen subcategories are discussed below, with a summary at the end of this section that identifies cross-category topics.

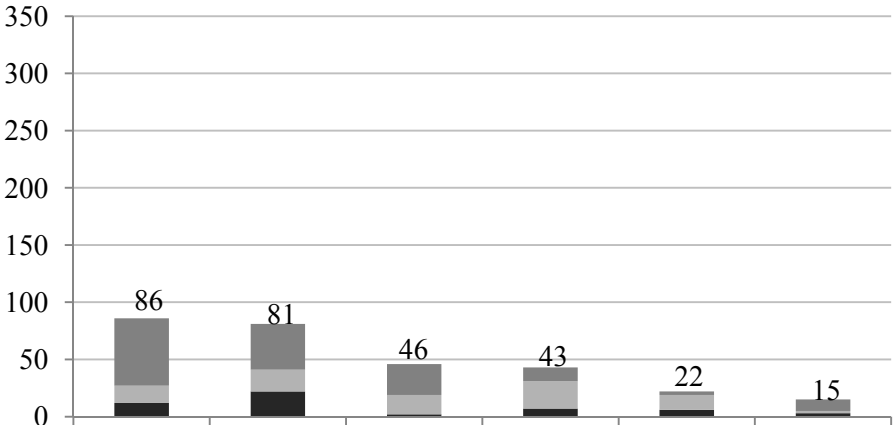
Analysis Process

Eleven of the fourteen interviewees and twenty-seven articles had one hundred seventy-seven coding mentions that were classified into this subcategory. The median rankings were 3.0 for the CEDAR participants, 3.7 for the Green Infrastructure participants, and 2.8 for the literature, with an overall average median of 2.9. The distributions within the groups differed significantly (Mann–Whitney $U = 89.5$, $n = 39$, $P = 0.035$ two-tailed). The difference in means can be attributed to the Green Infrastructure participants, whose average median rankings were significantly higher than the CEDAR participants (Mann–Whitney $U = 0.029$, $n = 11$, $P = 0.029$ two-tailed).




| | Imple-mentation Tools | Qual-ity of Life | Anal-ysis tools | Anal-ysis Pro-cess | Role of Eco-nomics | Frame -work | Con-text & Scale | Imple-mentation Pro-cess |
|---|---|---|---|---|---|---|---|---|
| Literature | 219 | 240 | 142 | 77 | 110 | 44 | 52 | 21 |
| Green Infrastructure | 47 | 10 | 44 | 55 | 7 | 21 | 41 | 52 |
| CEDAR | 28 | 8 | 25 | 45 | 4 | 44 | 13 | 21 |

Figure 14: Coding mentions by the participant groups, categorized by category and subcategory for the category Illustrate. Only the first seven subcategories are illustrated in this chart; the remaining subcategories are within Figure 13 (next page). Data labels on top of each column indicate the total coding mentions for each subcategory.




| | Role of Science | Open Space as Assets | Funding | Educa-tion | Transpar-ent Nature | Increases connect-ivity |
|---|---|---|---|---|---|---|
| Literature | 59 | 40 | 27 | 12 | 3 | 10 |
| Green Infrastructure | 15 | 19 | 17 | 24 | 13 | 2 |
| CEDAR | 12 | 22 | 2 | 7 | 6 | 3 |

Figure 15: Coding mentions by the participant groups, categorized by category and subcategory for the category Illustrate. The remaining six subcategories are illustrated in this chart; the initial seven sub- categories are within Figure 12 (previous page). Data labels on top of each column indicate the total coding mentions for each subcategory.

Overall, the literature and interview participants saw several strengths within the analysis process. First, several interviewees within the CEDAR process (CE2, CE5) noted the value of process sequence: where open space areas are identified first and development patterns are addressed second. A second strength of the analysis process is the use of scenarios to address uncertainty within analysis (Bolitzer and Netusil 2000; Conway and Lathrop 2005; Corry and Nassauer 2005; Haight, Snyder, and Revellet 2005; Polasky et al. 2005; Solecki and Oliveri 2004). One caution that Corry and Nassauer (2005) make in this regard is with respect to scales: specifically that “different scales of studies yield different results” (2005, 267). Thus, they note that finer patterns can be obscured when

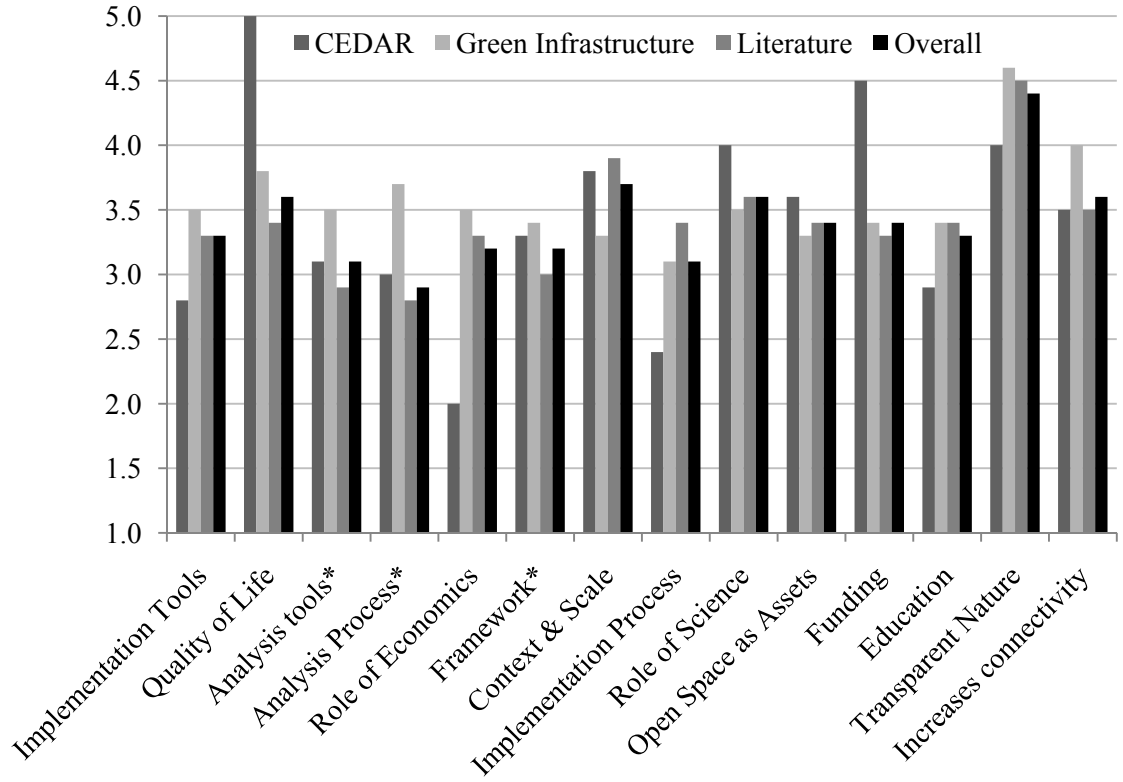



Figure 16: Average median rankings of the varying participant groups by subcategory for the category Illustrate. Note the * indicates the presence of a statistically different mean between the interviews and the literature ($P < 0.050$). Within this category, the subcategories Analysis Processes and Analysis Tools average median rankings between participant groups were statistically different ($P = 0.035$ and $P = 0.009$, respectively).

using coarser-scales of resolutions and planners must be aware of this obscuring process during their own analysis process.

All of the CEDAR interviewees (n = 5) and one Green Infrastructure participant (GI6) referenced the overlay process in their analysis process discussion, and three referred to Ian McHarg (CE1, CE2, CE4). Additionally, several interviewees made reference to the strong, defensible nature of their methodology (CE2, CE3, GI2, GI6), though some indicated it was less empirical than they originally thought. One example from a CEDAR participant is as follows:

> So how do we, in a very iron-clad and defensible way, change public policy so that everyone is comfortable and the form is to have these workshops, have presentations that early on tell people what the updates are going to be, and then simply go through the process (CE2, Page 9, Coded as Defensible methodology, Rank of 4).

Some interviewees and multiple authors (Armstrong 2000; Bhat 2003; Brody, Carrasco, and Highfield 2006; Bryant 2006; Corry and Nassauer 2005; Esbah, Cook, and Ewan 2009; Jantz, Goetz, and Jantz 2005; Krenichyn 2006; Polasky et al. 2005; Vandegrift and Yoked 2004) discussed concerns with their analysis process, including data simplification, limits to the analysis process, and limits to the data. From the literature, the majority of the authors highlighted uncertainty within their own method, whereas the interviewees discussed the lack of analysis tools or the lacking of appropriate use of tools, e.g., cost-estimating tools (GI2). Specific examples are as follows:

> And, then the GIS was a weakness in our office in that we didn't have that built into our budgets or built into our staff capabilities (CE4, Page 5, Coded as Concern: Analysis Weakness, Rank of 2 – note that the practitioners of this method have now acquired GIS software in-house).

> Existing landscapes may not be comparable to planned future landscapes, or measuring functions of large existing landscapes may be too costly (Corry and Nassauer 2005, Page 265, Coded as May not be able to plan future landscapes from existing landscapes, Rank of 2).

In addition to these areas, two topics were identified within this subcategory: data management and quality, and the prioritizing process. Under the data management and quality topic, ideas such as the need to ground-truth data in the analysis process and the lack of barriers to technical computing were identified. Weaknesses identified in the analysis process include data availability, data quality, and data accuracy (CE1, CE2, GI4, GI6, GI7; Brown et al. 2000; Hansen et al. 2000; Esbah, Cook, and Ewan 2009), though one interviewee noted surprise at how much data is available (GI4). GI4 also

noted the benefits of continuing through the analysis process, even though data may be limited in the following statement:

> Map with what you have, because by creating that map with what you have, you really often provides the impetus, the excitement and the funds needed to get the rest of the data that you need. And I think a lot of people sort of get stuck on, well, you know, we don't have all of the data, and it's really important to use what you have (GI4, Page 7, Coded as Data management/quality, Rank of 4).

The prioritizing process (in the analysis phase, see Priority and Decision Making Process for decision-making within an overall context), several processes were highlighted in the interviews and articles: goals as highest driver (GI6), overlay analysis – increased frequency of open space types equals higher value (CE1, CE2, CE3, CE4, CE5), economics as the prioritizing driver (GI2, GI4, GI5; Haight, Snyder, and Revellet 2005), regulations (GI7), consensus (Regan, Colyvan, and Markovchick-Nicholls 2006), and ecology as the highest driver (GI2, GI9; Corry and Nassauer 2005; Murphy 2001; Polasky et al. 2005; Riley et al. 2003; Stoms 2000).

In the CEDAR method, all participants discussed the overlay analysis process where the higher frequency of an open space type appearing within the public workshop, the higher value is associated with it during the analysis process. When other discussed ecology as the highest driver, several authors noted that a traditional prioritizing process was to prioritize based on the species or lands most vulnerable or threatened by development or another process of change (Polasky et al. 2005; Stoms 2000). Instead, many of the authors studied in this research were seeking methods of prioritization on multiple systems, e.g., ecology and economics (GI2, GI4, GI6; Haight, Snyder, and Revellet 2005; Polasky et al. 2005).

Weaknesses in the prioritizing process have been discussed earlier in the limits to analysis, but specific to this topic, two ideas were mentioned: the weakness in the synthesis process (CE1, CE2) and the lack of economic tools in priority-setting (GI2). When discussing the lack of economic tools in priority-setting, GI2 makes the following statement:

> That's a frequent oversight on the conservation community – a lot of conservation models rank-based models, just take a look at environment quality components but ignore costs altogether. That usually ends up leading to buying the biggest, but most expensive parcels. But with the use of financial optimization which is heavily used throughout the business community, we've found that we can buy a lot of good valued parcels and actually ending up buying more land for less cost that provide more overall environmental benefit at the end of the day. (GI2, Coded as Concern: Planners don't use cost-tools to make decisions, Rank of 2).

Analysis Tools

Thirteen of the fourteen interviewees and thirty-seven articles had coding mentions that were classified into this subcategory (n = 211). The median rankings were 3.1 for the CEDAR participants, 3.5 for the Green Infrastructure participants, and 3.0 for the literature, with an overall average median of 3.1. The distributions within the groups differed significantly (Mann–Whitney $U = 150.0$, $n = 50$, $P = 0.009$ two-tailed). The average median rankings between the Green Infrastructure participants and the Literature also differed significantly (Mann–Whitney $U = 78.0$, $n = 48$, $P = 0.001$ two-tailed).

Of all the tools discussed (Table 12), GIS was the most frequently cited (n = 34). Tools were classified based on their type, either map-based software, quantitative tools, or qualitative tools (Figure 11).

Table 12: Breakdown of the Analysis Tools by Type from the Interviews and the Literature.

| **Map-Based Software** (n = 105) | **Quantitative Tools** (n = 72) | **Qualitative Tools** (n = 34) |
|---|---|---|
| GIS (n = 34), including Landscape Analyst, Spatial Analyst and Least-Cost-Path Analyst tools | Statistical Analysis (SAS, Principle Component Analysis, etc) | Surveys |
| Landsat (Remote sensing) | Modeling | Policy audits |
| Landscape pattern indices | FRAGSTATS | Nvivo |
| GAP Analysis | PRIZM | Personal communications |
| CityGREEN | Economic modeling | Environmental Impact Assessments |
| LAFNS | Algorithms | Analytical Hierarchy Process |
| SLEUTH (Solecki and Oliveri 2004) | | Travel diaries |
| Road effect (Stoms 2000) | | |

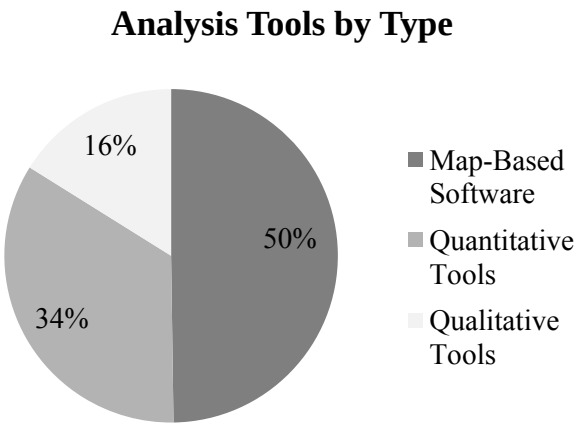



Figure 11: Chart of the analysis tools by type illustrating that map-based software (n = 105) was the most frequently mentioned tool within this research.

Context and Scale

Thirteen of the fourteen interviewees and twenty-two articles had coding mentions that were classified into this subcategory (n = 106). This subcategory had median rankings of 3.8 for the CEDAR participants, 3.3 for the Green Infrastructure participants, 3.9 for the literature, and an overall average median of 3.7. The distributions within the groups did not differ significantly (Mann–Whitney $U = 103.0$, $n = 36$, $P = 0.109$ two-tailed).

All of the coding mentions within this category were classified into four topic areas: context, local level, regionalism, and scalability. In reference to context, several interviewees identified that their project's strategies depended on the project's context (CE1, CE2, GI4, GI6, GI7, GI9) while several authors noted the importance of context for modeling efforts (Solecki and Oliveri 2004) or their planning efforts (Carter and Fowler 2008; Sagalyn 2007). Two dimensions of the context topic area were mentioned by Botequilha and Ahern (2002) that are worth mentioning: the notion of context as being more important than content and time.

> Some argue even that context is usually more important than content (Botequilha Leitão and Ahern 2002, Page 79, Coded as context is more important than context, Rank of 4).

These authors also mention the importance of time and space as fundamental planning dimensions (see also the subcategory of Paradigm Shifts).

In the topic area "Local Level," discussions ranged from the importance of local culture (Sagalyn 2007), how the local scale matters because this is where development occurs (Brody, Carrasco, and Highfield 2006; Jepson 2004; Sagalyn 2007; Talen and Knapp 2003), how the process works best on the municipal scale (CE1, CE2), the need to

target local areas for increased forms of understanding (Day 2006), how local data lead to better processes (Brabec, Schulte, and Richards 2002), and how the local scale is the most practical and relatable scale (Nassauer and Opdam 2008). Several examples of these statements are as follows:

> …For these reasons, the extent and nature of local planning office involvement in the enactment of sustainable development policies are of essential concern (Jepson 2004, Page 230, Coded as Local planning has a role, Rank of 5).

> While sprawl is indeed a regional problem, it is manifested at the local level with growth spiraling away from existing urban cores into adjacent jurisdictions (Brody, Carrasco, and Highfield 2006, Page 306, Coded as Need for local involvement in sprawl-related issues, Rank of 3).

> Designing at a "local" second-order watershed scale at which features and practices in the landscape pattern remain concrete and recognizable to local people who manage the landscape (Nassauer and Opdam 2008, Page 640, Coded as Local scale is practical and relatable, Rank of 3).

The one concern discussed within the Local Level topic area was that the CEDAR processes lacks a focus at the site design scale, see the following statement:

> But that's very much, um, a parcel-specific project. And, that's now what CEDAR does, we're looking at the big picture, so…because I obviously don't think TDR's work all that well, because nobody does them, so, you really have to have a project in mind that you think you're going to accomplish it with and negotiate through a development agreement. And, we weren't, we were not that focused on site design when I was working there (CE3, Page 16, Coded as Concern: not much focus on the site scale (where you can implement, Rank of 2).

In the Regionalism topic area, several authors discussed the importance of a regional perspective for dealing with growth management (Bengston, Fletcher, and Nelson 2004; Brody, Carrasco, and Highfield 2006; Daniels and Lapping 2005; Downs 2005) and for more holistic perspectives on growth and sustainability (Berke 2002; Botequilha Leitão and Ahern 2002; Bryant 2006; Forman 2008). However, one interviewee (GI7) suggested that the regional scale does not resonate with citizens in his

area and the lack of regional thinking at the local scale (Brody, Carrasco, and Highfield 2006). Examples of these statements are as follows:

> So, sort of the global take on you know, greenway planning or green infrastructure/conservation at a regional scale, I've learned for our community doesn't really sell, because the perception of it, and the actual attributes of the green infrastructure vary so much from community to community, that you really have to get into it a lot more and then really understand what your options area and what the possibilities are in order to take the next step, and so I think we've, we're finding that, um, we need to be working more at a local level (GI7, Page 30, Coded as Concern: GI at a regional scale does not resonate, Rank of 2).

> Several key Smart Growth principles require government action at the regional or state level, not at the local government level where most powers over land use planning now reside (Downs 2005, Page 369, Coded as Smart Growth principles need regional and state action, Rank of 5).

The final topic area in this subcategory is the notion of scalability of the models. Strengths discussed in this topic area included the scalability of the participants' or authors' respective models (CE2, GI2, GI7, GI8; Botequilha Leitão and Ahern 2002; Jabareen 2006; Zipperer et al. 2000). Instead, concerns were focused on the limits of scale understanding (GI2; Polasky et al. 2005) and that people do not tend to connect with broader scales (GI3). Specific examples include the following:

> The sustainability concept is arguably relevant to systems from the global to the local scale (Botequilha Leitão and Ahern 2002, Page 66, Coded as Sustainability concept is relevant at all scales, Rank of 4).

> You can do regional size, sub-regional, or municipal size workshops, um, it's just you know, you just have to deal with different types of data. And you can still involve people at all those levels, it's just that you can't expect them to give you the exact location of things at a regional level like you could at a municipal level (CE2, Page 20, Coded as Scale of project dictates data needs, Rank of 3).

> In conflict, in a lower case C not an upper case C, I would think for example, one thing that we have, in terms of multiple perspectives, getting people to understand the scale issue that we are not talking about an individual parcel, but we are talking about the landscape-scale approach. (GI2, Coded as Concern: People don't see scale issue, Rank of 2).

Education

Ten interviewees (CE1, CE2, CE3, CE4, GI1, GI2, GI4, GI5, GI7, GI8) and five articles (Carter and Fowler 2008; Jabareen 2006; Jepson 2004; Riley et al. 2003; Thompson 2004) have coding mentions within this subcategory. This subcategory had median rankings of 2.9 for the CEDAR participants, 3.4 for the Green Infrastructure participants, 3.4 for the literature, and an overall average median of 3.3. The distributions within the groups did not differ significantly (Mann–Whitney $U = 24.5$, $n = 15$, $P = 0.949$ two-tailed).

One interviewee noted how their stewardship and educational programs kept them in touch with their constituency:

> I look at the broader Greenway stuff that we do is all about this convening and catalyzing and inspiring, um, action, but there's a whole other level that we do that's more at the staff level organization is that we run a stewardship program... I think that if we just did the convening-catalyzing part we wouldn't have as much credibility or as much knowledge, um, but this stewardship program, the self-funded kind of thing, in other words, to go out for project work and rescale the size of the program to how much project work that we can handle or that is available. And, that keeps us in touch, both increases credibility with the agencies, and under-promise and over-deliver, you know, if we take on a contract that they are really going to be happy with it. (GI8, Page 16, Coded as Stewardship program increases credibility and education, Rank of 3).

Several interviewees and authors indicated the need for education (GI7, GI8; Carter and Fowler 2008; Riley et al. 2003; Thompson 2004), but at the same time, Thompson (2004) notes that education alone will not bridge the gap between vision and implementation:

> …education alone is not a sufficient step…in fact, even when information successfully changes attitudes, it often does not change behavior (Thompson 2004, Page 143, Coded as Education alone is not enough, Rank of 1).

Six interviewees discussed the role of the planner in the educational process (CE1, CE2, CE3, GI1, GI2, GI4). One participant identified their main role as that of education (CE1), while others saw it as a component of their work (CE2, CE3, GI1, GI2, GI4).

Framework

Eleven interviewees and five articles have coding mentions within this subcategory (n = 109). The median rankings were 3.3 for the CEDAR participants, 3.4 for the Green Infrastructure participants, and 3.0 for the literature, with an overall average median of 3.2. The distributions within the groups differed significantly (Mann–Whitney $U = 45.0$, $n = 25$, $P = 0.040$ two-tailed). The average median rankings between the Green Infrastructure participants and the Literature also differed significantly (Mann–Whitney $U = 23.0$, $n = 20$, $P = 0.039$ two-tailed).

Coding mentions of note include two topics that arose during the interviews: the accessibility of the framework (CE1, CE5) and that the framework provides a consistent vocabulary (GI1). Specific examples are as follows:

> Uh, no, no, I think it's that, I think the benefit of the model that's always struck a chord with me is that it is so intuitive and it's such a, it's so open to all citizens participating regardless of their experience and knowledge in planning or like we were talking about earlier, whether they are a bird watcher or a rancher of Ph.D. ecologist, they all have valid inputs to add to the discussion. And it really helps people see how zoning allows for a future that's in conflict with what they appreciate about their community today. It's a great conversation starter, but it's not a finisher (CE5, Page 12, Coded as Accessibility of Model, Rank of 4).

> Master plans across the country lacked consistent vocabulary – GI provides that (GI1, Page 3, Coded as GI provides consistent vocabulary, Rank of 3).

However, it should be noted that in CE5's statement above, he does not see the framework as one that is successful at implementation.

One more concept that was generally discussed as a concern was the lack of a universal framework to guide planning (Sagalyn 2007, specifically in reference to public/private development partnerships), whereas other participants (CE3, GI1) urged that planners should avoid thinking any one framework is a panacea:

> Or the things to avoid? I'll go back to things to avoid – thinking that one system can solve every problem. CEDAR kind of makes you think that one system can do it all, but it really is, there are a lot of things that have to be compromised or trade-offs. (CE3, Page 19, Coded as Avoid: thinking that one system is a panacea, Rank of 1).

Funding

This subcategory had median rankings of 4.5 for the CEDAR participants, 3.4 for the Green Infrastructure participants, 3.3 for the literature, and an overall average median of 3.4. The distributions within the groups did not differ significantly (Mann–Whitney $U = 51.0$, $n = 22$, $P = 0.606$ two-tailed).

The range of funding tools mentioned by the interview participants and the authors, including collaboration (GI5, GI9), market-based incentives (Bengston, Fletcher, and Nelson 2004; Carter and Fowler 2008; Esbah, Cook, and Ewan 2009; Sagalyn 2007), open space bonds (GI5, GI9; Bolitzer and Netusil 2000; Daniels and Lapping 2005), policies and programs (Bengston, Fletcher, and Nelson 2004; Carter and Fowler 2008; Daniels and Lapping 2005; Talen and Knaap 2003), and taxes (GI7; Bengston, Fletcher, and Nelson 2004; Brody, Carrasco, and Highfield 2006; Nelson 2006; Talen and Knaap 2003) (see Table 13 for a full list of these tools). Specific examples include the following statements:

Table 13: Funding tools mentioned by the interview participants and authors – including collaboration, market-based incentives, open space bonds, and policies and programs.

| Funding Tool | Interview Participant or Authors |
|---|---|
| Collaboration | GI5, GI9 |
| Market-based Incentives | Bengston, Fletcher, and Nelson 2004; Carter and Fowler 2008; Esbah, Cook, and Ewan 2009; Sagalyn 2007 |
| Open Space Bonds | GI5, GI9; Bolitzer and Netusil 2000; Daniels and Lapping 2005 |
| Policies & Programs | Bengston, Fletcher, and Nelson 2004 (subdivision exactions); Carter and Fowler 2008 (subsidies, performance standards, grants, and direct financing); Daniels and Lapping 2005 (Forest Legacy Program, Land and Water Conservation Fund); Talen and Knapp 2003 (impact fees) |
| Taxes | GI7; Bengston, Fletcher, and Nelson 2004; Brody, Carrasco, and Highfield 2006; Nelson 2006; Talen and Knapp 2003 |

> The most appropriate response may be to provide incentives and or subsidies to facilitate transformation of existing urban areas incrementally (Esbah, Cook, and Ewan 2009, Page 858, Coded as provision of incentives and/or subsidies, Rank of 5).
>
> Tax policy has a powerful influence on land use and therefore may be an important tool for growth management (Bengston, Fletcher, and Nelson 2004, Coded as Tax policy, Rank of 4).

Implementation Process

All fourteen interviewees and ten articles had coding mentions that were classified into this subcategory (n = 94). This subcategory had median rankings of 2.4 for the CEDAR participants, 3.1 for the Green Infrastructure participants, 3.4 for the literature, and an overall average median of 3.1. The distributions within the groups did not differ significantly (Mann–Whitney $U = 51.5$, $n = 23$, $P = 0.389$ two-tailed).

Two topic areas in this subcategory were identified: the prioritizing process and transitions from analysis to implementation. Coding mentions that were not categorized into these topic areas ranged from the notion that implementation is not easy (GI1), implementation is success (GI4), the need for implementation at the individual level (Thompson 2004), and the effect of the implementation process on public policy (Jepson 2004; Talen and Knapp 2003). Specific comments include the following:

> With widely dispersed behaviors…government monitoring and coercive enforcement is not a promising social control (Thompson 2004, Page 143, Coded as Implementation is a challenge, Rank of 1).

> Well, I guess the question is, you know, the question of success is debatable, because there have been cases, I am not sure whether you could say that a planning map is successful or not…whether it's implemented maybe is successful (GI4, Page 4, Coded as Success equals Implementation, Rank of 3).

> It can be seen that policies and techniques in which the most action has been taken tend to be related to land development and land use planning (Jepson 2004, Page 232, Coded as Implementation occurs mostly within built environment policies, Rank of 4).

In the topic area "Prioritizing Process," coding mentions include the following: economic tools (GI2, GI4, GI5, GI8), that implementation areas meet their priorities (local priorities, GI7; size of parcel, GI8), or the barriers to implementation (GI7; Downs 2005; Thompson 2004). One example is as follows:

> If designers of green developments are going to change behavior, they need to recognize barriers to change and design educational materials…to overcome those barriers (Thompson 2004, Page 151, Coded as focus on overcoming barriers, Rank of 5).

Comments that were categorized into the "Transitions from Analysis to Implementation" topic area ranged from the difficulties of transitioning from analysis to implementation (CE2, CE3, CE5, GI1, GI3, GI4, GI7; Downs 2005) to the need to focus more on implementation instead of analysis (CE3, GI1). Where spoken of as a strength,

several planners suggested the contextual nature of implementation in that implementation is a political process (CE1, CE2, CE3, CE4) and the need to identify during the analysis phase what can actually be accomplished (CE3, GI1, GI2). Specific examples include the following statements:

> So, kind of, another best practice is really thinking strategically and writing a strategic plan from the beginning of what you think you're going to get, what type of tool do you think that city is going to use in the end (CE3, Page 17, Coded as Identify what the city will actually do/implement, Rank of 4).

> Smart growth is much more talked about than actually carried out in practice (Downs 2005, Page 367, Coded as Gap between analysis and implementation, Rank of 2).

> I think the biggest jump; and the biggest challenge is going from the mapping to actual implementation, because it's often either policy or land, um, sort of land acquisition and if it's a large organization like the Nature Conservancy, that gains a certain amount of funds, or the Conservation Fund, then these types of maps are very useful and they'll start using them right away, in terms of how to funnel the money right away into land acquisition or easement purchases. If it is a municipality, in terms of looking at, sort of larger green infrastructure, or a county looking at a larger GI, it sometimes get a little sticky with how lands fall in terms of ownership (GI4, Page 14, Coded as A lot of work to transition from planning to implementation, Rank of 1).

## Implementation Tools

This category had the highest number of coding mentions of all the grounded theory subcategories (n = 295). This subcategory had median rankings of 2.8 for the CEDAR participants, 3.5 for the Green Infrastructure participants, 3.3 for the literature, and an overall average median of 3.3. The distributions within the groups did not differ significantly (Mann–Whitney $U = 183.5$, $n = 40$, $P = 0.943$ two-tailed). Twenty-one types of open space implementation tools were discussed within the interviews and the literature, see Table 14.

Table 14: Categorization of Implementation Tools and the Interview Participants or Author(s) who mentioned them.

| Tools Mentioned | Interview Participant or Author(s) |
|---|---|
| Analysis tools guide implementation (n=3) | GI7, GI9 (GIS); Berke 2002 (visual tools) |
| Buffers/corridors (n=11) | GI7; Bryant 2006; Conway and Lathrop 2005; Esbah, Cook, and Ewan 2009; Miller et al. 2003; Odell and Knight 2001 |
| Built Environment (n=46) | GI1, GI7, GI8; Bowman, Thompson, and Colletti 2009; Brabec, Richards, and Schulte 2002; Brody, Carrasco, and Highfield 2006; Bryant 2006; Carter and Fowler 2008; Day 2006; Jabareen 2006; Kim and Kaplan 2004; Kuo 2001; Luck and Wu 2002; Talen and Knapp 2003 |
| Change in Land Consumption (n=2) | Conway and Lathrop 2005; Daniels and Lapping 2005 |
| Cluster Development (n=13) | GI1, Bengston, Fletcher, and Nelson 2004; Brody, Carrasco, and Highfield 2006; Conway and Lathrop 2005; Daniels and Lapping 2005; Odell and Knight 2001; Talen and Knapp 2003 |
| Conservation Easements (n=28) | CE2, CE3; Bengston, Fletcher, and Nelson 2004; Bryant 2006; Brody, Carrasco, and Highfield 2006; Daniels and Lapping 2005; Hansen et al. 2005; Merenlender et al. 2004; Odell and Knight 2001 |
| Conservation Subdivisions (n=8) | CE2, CE3; Bowman, Thompson, and Colletti 2009 |
| Economic Tools (n=7) | CE2 (shift costs to developers); GI1 (incentives); GI2 (financial optimization); Bengston, Fletcher, and Nelson 2004 (taxes); Carter and Fowler 2008 (market-based incentives); Merenlender et al. 2004 (taxes); Nelson 2006 (location-efficient mortgage) |
| Greenbelts/greenways (n=7) | Bengston, Fletcher, and Nelson 2004; Bryant 2006; Jabareen 2006 |
| Growth Boundaries (n=10) | GI5; Bengston, Fletcher, and Nelson 2004; Bolitzer and Nutisil 2003; Downs 2005; Hansen et al. 2005; Jabareen 2006 |
| Implementation Toolbox (both as a need and limited tools available) (n=30) | CE1, CE3, CE4, GI1, GI2, GI3, GI7, GI8; Bengston, Fletcher, and Nelson 2004; Botequilha Leitão and Ahern 2002; Carter and Fowler 2008; Conway and Lathrop 2005; Corry and Nassauer 2005; Daniels and Lapping 2005; Miller et al. 2003; Talen and Knapp 2003 |

| Tools Mentioned | Interview Participant or Author(s) |
|---|---|
| Meetings (n=4) | GI5, GI7, GI9 |
| Monitoring (n=12) | GI5, GI8; Botequilha Leitão and Ahern 2002; Esbah, Cook, and Ewan 2009; Jantz, Goetz, and Jantz 2005; Merenlender et al. 2004; Thompson 2004 |
| Need to see and feel these ideas (n=4) | Carter and Fowler 2008 (green roofs); Thompson 2004 (education, what change looks like) |
| Overall Paradigms (n=8) | GI5 (Regional Leadership Model); Botequilha Leitão and Ahern 2002 (Adaptive Management); Downs 2005 (Smart Growth); Jabereen 2006 (Smart Growth, Compact Development) |
| Permanent Implementation Tools (n=3) | CE2, CE3; Merenlender et al. 2004 |
| Policies and Zoning (n=60) | CE1, CE2, CE3, GI1, GI4, GI7, GI9; Bengston, Fletcher, and Nelson 2004; Brody, Carrasco, and Highfield 2006; Carter and Fowler 2008; Conway and Lathrop 2005; Hansen et al. 2005; McMillan 2005; Nelson 2006; Talen and Knapp 2003; Thompson 2004 |
| Preserves/Land Preservation/Open Space Protection (n=12) | Bhat 2003; Carter and Fowler 2008; Conway and Lathrop 2005; Esbah, Cook, and Ewan 2009; Daniels and Lapping 2005; Merenlender et al. 2004 |
| Private Land Conservation (n=4) | Daniels and Lapping 2005; Polasky et al. 2005; Troy et al. 2007 |
| Purchase of Development Rights (n=13) | CE3, GI8; Conway and Lathrop 2005; Bengston, Fletcher, and Nelson 2004; Daniels and Lapping 2005; Merenlender et al. 2004 |
| Transfer of Development Rights (n=9) | CE3, GI1, GI7, GI8; Bengston, Fletcher, and Nelson 2004; Brody, Carrasco, and Highfield 2006; Daniels and Lapping 2005; Downs 2005 |

Instead of creating twenty-one topic areas, examples from the three categories with the highest coding mentions are illustrated below:

*Built Environment*

> Consequently, there is a growing recognition that we need to design and build communities that respect and work with local ecological systems (Thompson 2004, Coded as need to design and build communities in harmony with nature, Rank of 4).

> Compactness of the built environment is a widely acceptable strategy through which more sustainable urban forms might be achieved (Jabareen 2006, Page 39, Coded as Compactness as a strategy for urban form, Rank of 4).

*Implementation Toolbox*

> One of the clear lessons from the growth management literature is that the use of multiple, reinforcing policy instruments is far more effective than relying on a single technique (Bengston, Fletcher, and Nelson 2004, Coded as Need multiple, reinforcing implementation tools, Page 281, Rank of 4).

> We knew that implementation was every city's Achilles' heel, and we hadn't figured it out yet either. We had a couple of things, the ordinance audit and the conservation design ordinance and conservation design…um, workshop. It showed people how to do it. But we didn't have cities really signed up doing it yet. So, I think I left prematurely, which is to say that it didn't really get executed. (CE3, Page 5, Coded as Concern: Limited Implementation Toolbox, Rank of 2).

*Policies and Zoning*

> We took that map, and as far as I know it's the first time in the country, but took a map that was developed by the scientists and we went through it comprehensively and used planning update in early 2000, so I think 2001 it was adopted, the map actually was adopted, as guiding land use intensities around the county (GI9, Page 20, Coded as Policy adoption, Rank of 3).

> There is also the view that the effects of exurban development are proportional to home density. Thus, zoning for lower density housing is often used to protect ecological resources (Hansen et al. 2005, Page 1894, Coded as Lower density for protection of ecological resources, Rank of 3).

> The results of the model highlight the limitations of using a down-zoning approach to meet other ecological objectives associated with terrestrial fragmentation (Conway and Lathrop 2005, Page 287, Coded as Down-zoning limits, Rank of 2).

> And effective implementation can only be occur through the municipal level zoning and planning, et cetera (CE1, Page 24, Coded as Implementation only through policy changes, Rank of 5).

Increases Connectivity with Landscape

Four interview participants and four articles had coding mentions that were classified into this subcategory (n = 15). This subcategory had median rankings of 3.5 for

the CEDAR participants, 4.0 for the Green Infrastructure participants, 3.5 for the literature, and an overall average median of 3.6. The distributions within the groups did not differ significantly (Mann–Whitney $U = 6.0$, $n = 8$, $P = 0.495$ two-tailed).

Mentions in this category discussed how open space increases connectivity with the landscape (CE1, CE2, GI4, GI5; Thompson 2004), how people need to have a sense of connection with the natural world (Kim and Kaplan 2004 Mayer et al. 2009), or the notion of connectivity for both humans and landscapes (Zipperer et al. 2000). Specific examples include the following:

> Likewise, the connectivity of greenspaces within a neighborhood to adjacent and regional greenspaces may be critical to maintaining metapopulations for a variety of species, especially in a highly fragmented landscape (Zipperer et al. 200, Page 688, Coded as Connectivity, Rank of 4).
> They may also want to think of how people need to feel a sense of belonging to something larger than themselves and that this need may be fulfilled through a sense of belonging or connectedness to the natural world (Mayer et al. 2009, Page 635, Coded as sense of belonging to the natural world, Rank of 3).
>
> What I think of in terms of sustainability for modern, formal human habitation is that you have to continue to honor and reflect networks of open spaces (CE2, Page 31, Coded as Sustainability definition – honor and reflect open space networks, Rank of 5).

Open Space as Assets

Eleven interview participants and thirteen articles had coding mentions that were classified into this subcategory (n = 81). This subcategory had median rankings of 3.6 for the CEDAR participants, 3.3 for the Green Infrastructure participants, 3.4 for the literature, and an overall average median of 3.4. The distributions within the groups did not differ significantly (Mann–Whitney $U = 70.0$, $n = 25$, $P = 0.495$ two-tailed).

Several general areas were discussed in this subcategory, including the value of utility corridors (CE1, CE3, CE3; Daniels and Lapping 2005), the value of open space in

urban areas (Daniels and Lapping 2005; Esbah, Cook, and Ewan 2009; Jabareen 2006; Regan, Colyvan, and Markovchick-Nicholls 2006; Troy et al. 2007), and public sentiment toward open space (CE2, GI7; Bolitzer and Netusil 2000; Bowman, Thompson, and Colletti 2009). One participant (GI8) discussed the celebratory feel of open space assets. Specific examples include the following statements:

> One of those things, I guess, because I don't want to forget to say this, that I appreciate much more now is the concept is that you do need to develop, that development makes open space preservation possible and so that, D in CEDAR that nobody ever understood, that everyone really struggled with, that always sort of made sense to me in the way that there are some open spaces that are development like corridors of power and so on…but there is also this component that you had to think about development. Now, it makes perfect sense, and now I think it's the most important thing we never really focused on because it didn't make sense to people (CE3, Page 16, Coded as value of utility corridors for open space, Rank of 5).

> Urban open space provides a range of benefits to metropolitan populations (Regan, Colyvan, and Markovchick-Nicholls 2006, Page 168, Coded as Multiple benefits of open space, Rank of 3).

> The concern for preservation of natural areas during development is not a recent phenomenon (Bowman, Thompson, and Colletti 2009, Page 322, Coded as Public sentiment toward natural areas is not new, Rank of 3).

> I had the enjoyment of being out on the Greenway all day today, um, we have just a real celebratory feel that this is a positive thing that we are all doing together because it's for the quality of life of all of us (GI8, Page 3, Coded as Celebratory feel, Rank of 4).

In addition to the topics listed above, eleven of the interview participants (CE1, CE2, CE3, CE4, GI2, GI4, GI5, GI6, GI7, GI9) and four articles (Daniels and Lapping 2005; Esbah, Cook, and Ewan 2009; Forman 2008; Talen and Knapp 2003) discussed the topic Area "Open Space Typology/Multiple Names of Open Space." Most of the discussion within this topic Area revolved around the multiple names or multiple meanings of the terms used in open space planning, e.g., the multiple meanings of Green

Infrastructure (GI2, GI4, GI5, GI6, GI7, GI9). A second form of discussion that arose from the literature and interviews were other typologies, including smart growth (Daniels and Lapping 2005; Talen and Knapp 2003) and urban ecology (Esbah, Cook, and Ewan 2009).

Quality of Life

Almost solely a subcategory derived from the literature, only eighteen of the two hundred fifty-eight mentions in this category were discussed in the interviews. This subcategory had median rankings of 5.0 for the CEDAR participants, 3.8 for the Green Infrastructure participants, 3.4 for the literature, and an overall average median of 3.6. While the distributions within the groups did not differ significantly (Mann–Whitney $U = 30.0$, $n = 30$, $P = 0.055$ two-tailed), the median rankings between the CEDAR participants and the literature did (Mann–Whitney $U = 1.0$, $n = 27$, $P = 0.019$ two-tailed).

With an average ranking of 3.5 on the Likert scale metric, this subcategory included three topic areas: built environment, health and restorative effects, and social capital, equity, and networks. Issues discussed within the Built Environment topic area included the relationship between the built environment and physical activity (Day 2006; Rodriguez, Khattak, and Evenson 2006), the notion of safety within the built environment (CE1; Day 2006; Krenichyn 2006), the changes in housing demand over the next century (Nelson 2006), and the limits to associating the built environment with quality of life (Day 2006; Downs 2005). Specific examples are as follows:

> …We found that households in the New Urbanist neighborhood made 1.6 fewer auto trips and traveled 14.7 vehicle miles per day than those in the conventional neighborhoods (Rodriguez, Khattak, and Evenson 2006, Page 50, Coded as Neotraditional neighborhood residents made less automobile trips, Rank of 4).

> She argues that for physical activity to occur, factors such as accessibility and safety are fundamental (Day 2006, Page 93, Coded as Safety and accessibility issues are paramount, Rank of 5).
>
> Put differently, the market demand for new homes through 2025 may be almost exclusively for attached and small-lot units (Nelson 2006, Page 397, Coded as Changing Market Demands, Rank of 4).

Two main themes arose within the health and restorative effects topic area: the relationship between urban form and health, and the restorative power of nature. In the relationship between urban form and health, several authors noted the documented idea that decreasing distances to destination increases physical activity (Cohen, Inagami, and Finch 2008; Day 2006; Jabareen 2006; Lee and Moudon 2004; McMillan 2005; Rodriguez, Khattak, and Evenson 2006). Kim and Kaplan (2001) and Rodriguez, Khattak, and Evenson (2006) found that New Urbanist and neotraditional neighborhood residents, respectively, tend to exercise more in their own neighborhoods. Examples of these concepts include the following:

> This is consistent with findings in the planning literature that distance to destinations is a determinant factor for transportation mode choice (Lee and Moudon 2004, Page 159, Coded as Distance is a determinant to mode choice, Rank of 3).
>
> The physical distance between home and school limited the transportation options available to a household and was a strong determinant in a parent's decision on how children travel to school (McMillan 2005, Page 450, Coded as Distance is a determinant to mode choice, Rank of 4).
>
> The ample presence of natural features and their design all increase the attraction of walking within the community (Kim and Kaplan 2004, Page 335, Coded as Physical activity associated with the urban form, Rank of 4).

The second theme discussed within this topic area is the power of nature. One interview participant and several authors discussed the restorative powers of nature (GI5; Armstrong 2000; Jabareen 2006; Kaplan 2001; Krenichyn 2006; Kuo 2001; Mayer et al.

2009). Kuo and Sullivan (2001) noted the relationship between vegetated open spaces and the reduction in crime. Specific examples include the following statements:

> On the whole then, the empirical literature to date provides reasonable confidence in the restorative effects of nature on attention and effectiveness (Kuo 2001, Page 8, Coded as Restorative effects of nature, Rank of 4).

> Specifically, we propose that vegetation may deter crime both by increasing formal surveillance and by mitigating some of the psychological precursors to violence (Kuo and Sullivan, Page 361, Coded as Vegetation decreases incidences of crime, Rank of 3).

Three main areas of discussion formed the Social Capital, Equity, and Networks topic area: the equitable distribution of experiences (GI5, GI7), the role of parks and open space in establishing social capital and enhancing social networks (Armstrong 2000; Cohen, Inagami, and Finch 2008; Day 2006; Jabareen 2006; Krenichyn 2006; Lee and Moudon 2004; Thompson 2004), and the relationship between social acceptance and physical activity (Day 2006; McMillan 2005). It should be noted that in the discussion surrounding the role of parks and increasing social networking, parks were also seen as a place of fear (Krenichyn 2006; Lee and Moudon 2004). Examples of these three areas of discussion are as follows:

> We certainly look at the distribution and that's what I'm talking about – the distribution of experience of nature; it doesn't have to be the distribution of community parks or regional parks, but we look for gaps, we're particularly sensitive to low-income or ethnic diversity, where there is no experience of nature to be had in sight (GI5, Page 17, Coded as Distribution of experiences, Rank of 4).

> Community gardens that were located in low-income neighborhoods were four times as likely as gardens not in low-income areas to lead to other issues in the neighborhood being addressed (Armstrong 2000, Page 324, Coded as Community gardens increase connectivity, especially in low-income areas, Rank of 4).

Role of Economics

Seven interview participants and nineteen articles had coding mentions that were classified into this subcategory (n = 121). This subcategory had median rankings of 2.0 for the CEDAR participants, 3.5 for the Green Infrastructure participants, 3.3 for the literature, and an overall average median of 3.2. While the distributions within the groups did not differ significantly (Mann–Whitney $U = 58.5$, $n = 27$, $P = 0.511$ two-tailed), the median rankings between the CEDAR participants and the other groups did (with the Green Infrastructure participants: Mann–Whitney $U = 0.0$, $n = 7$, $P = 0.042$ two-tailed; with the literature: Mann–Whitney $U = 3.0$, $n = 22$, $P = 0.045$ two-tailed).

Overall, comments included the role of ecosystem services (GI7; Bhat 2003; Carter and Fowler 2008), how preserving open spaces have helped their communities be resilient in hard economic times (GI8) and the use of economic modeling in testing the hypothesis that proximity to open space increases property values (Bhat 2003; Bolitzer and Netusil 2000; Bowman, Thompson, and Colletti 2009; Troy et al. 2007). Specific examples include the following:

> So I think the stream setbacks are on one…It saves communities, you know it will save our region over the long term hundreds of millions of dollars because we won't be paying for all of this mitigation activity (GI7, Page 32, Coded as Stream buffers can save millions of dollars, Rank of 4).

> Results from our analysis indicate that distance from a home to an open space and the type of open space can have a statistically significant effect on a home's sale price (Bolitzer and Netusil 2000, Coded as Distance from homes to open space can have an effect on sale price, Rank of 4).

Additional comments included market failures that include the lack of satisfying development patterns (Daniels and Lapping 2005) and the changing housing demand in the coming century (Nelson 2006). One study (Polasky et al. 2005) examined the

tradeoffs between working lands and biodiversity that have been studied in a modeling effort and found that if either working lands or biodiversity were maximized in the model, significant tradeoffs were made. Instead, if optimizing both elements was modeled, approximately 85% of working lands and biodiversity goals could be met.

In addition to these general areas, one topic area was identified: socioeconomic factors. Positive effects at a higher socioeconomic status included greater tree cover (Troy et al. 2007), decreased obesity (Vandegrift and Yoked 2004), and increased property values and educational status (Troy et al. 2007). Negative effects, associated with a lower socioeconomic status and often minorities (Cutchin 2007), include increased obesity (Vandegrift and Yoked 2004) and lack of affordable housing options (Downs 2005). Examples of coding mentions under this topic area are as follows:

> Yet another problem caused by Smart Growth policies is a tendency to raise housing prices (Downs 2005, Page 371, Coded as Smart Growth policies can raise housing prices, Rank of 2).

> The results in Table 3 show that, as expected, income per capita exerted a significant negative effect on the obesity rate (Vandegrift and Yoked 2004, Page 224, Coded as Increased income, decreased obesity, Rank of 4).

Role of Science

Eleven interview participants and twenty articles had coding mentions within this subcategory (n = 86). This subcategory had median rankings of 4.0 for the CEDAR participants, 3.5 for the Green Infrastructure participants, 3.6 for the literature, and an overall average median of 3.6. The distributions within the groups did not differ significantly (Mann–Whitney $U = 106.0$, $n = 31$, $P = 0.866$ two-tailed). Within the larger discussion on the role of science, three areas were discussed: acknowledging uncertainty, the need for science to be more involved in systems thinking, and the role of science in

creating informed citizens. GI2 discusses how planners and scientists need to acknowledge uncertainty within science:

> And, science changes and you know, you need to be communicating with people – you need to manage that change up front by telling people that, based on the latest scientific information, but that doesn't mean that our understanding of the science won't change. So basically preparing people for that, I think is very useful (GI2, Page 23, Coded as Changing nature of scientific understanding, Rank of 5).

Nassauer and Opdam (2008) see a need for science to become more integrated:

> This would mean a change in science - from an emphasis on analysis and reductionism toward a goal of synthesis and integration that challenges conventional norms of scientific adequacy (Nassauer and Opdam 2008, Page 634, Coded as Fundamental changes in scientific paradigm needed, Rank of 3).

Several interview participants (CE4, GI7, and GI8) note how science can play in role in creating an informed citizenry. One example is as follows:

> …Guess my, you know your question about science is interesting to me, because, so by developing new data or more data, and raising the sophistication and quality of the public discourse, because the premise is that we'll get better decisions because we'll have more informed debate, so we spend a lot of time on that (GI7, Page 29, Coded as Create informed citizens, Rank of 4).

The one topic area that arose of out this subcategory is the "Role of Landscape Ecology." Multiple interview participants (CE3, GI2, GI4) and sixteen articles discussed this topic, highlighting the different landscape ecology terms they used to design their process around, e.g., connectivity, corridors, patches, etc. Additional discussion points included using landscape ecology as the basis for landscape planning (CE3, Botequilha Leitão and Ahern 2002; Forman 2008) and the need to research where people live (Miller et al. 2003). Despite the basis of each of these models on ecological principles, there was a paucity of coding mentions related to landscape ecology arising from the interview participants.

Transparent Nature

Six interview participants and two articles had coding mentions within this subcategory (n = 22). This subcategory had median rankings of 4.0 for the CEDAR participants, 4.6 for the Green Infrastructure participants, 4.5 for the literature, and an overall average median of 4.4, giving this subcategory the highest median ranking of all the subcategories within this study. The distributions within the groups did not differ significantly (Mann–Whitney $U = 5.5$, $n = 8$, $P = 0.863$ two-tailed).

Comments made during the interviews and in the literature in this subcategory covered four areas: be clear and transparent about your process (CE2, CE4, GI2, GI3, GI4, GI6; Botequilha Leitão and Ahern 2002; Sagalyn 2007), acknowledge uncertainty (GI2), make sure the data is clear (GI4. GI6) and the greater variety in alternatives, the more transparent the process can be (Botequilha Leitão and Ahern 2002). Specific examples of these areas are displayed below:

> Um, I think a pre-determined outcome is suspect in planning generally and um, people need to see that it's transparent and publicly-driven (CE4, Page 10, Coded as Be Open and Transparent, Rank of 5).

> You need to manage that change up front by telling people that, based on the latest scientific information, but that doesn't mean that our understanding of the science won't change. So basically preparing people for that, I think is very useful. Because otherwise, people, some people want to see okay, this is the plan and this is carved in stone, and if you change that plan in five years, well, people will say, well, didn't you get it right the first time? Why are we changing it? (GI2, Page 23, Coded as Acknowledge uncertainty, be clear, Rank of 5).

> I guess one of them is that the data has to be really clear. That the process the data is being used is really clear. Because I'm often not actually manipulating the data; I'm looking at it (GI4, Page 19, Coded as Transparent Nature of Data, Rank of 5).

> The wider the spectrum of alternatives the more useful it becomes both for public discussion and for increasing transparency in the decision-making process (Botequilha Leitão and Ahern 2002, Page 82, Coded as Wider the spectrum of alternatives, the more transparent the process, Rank of 4).

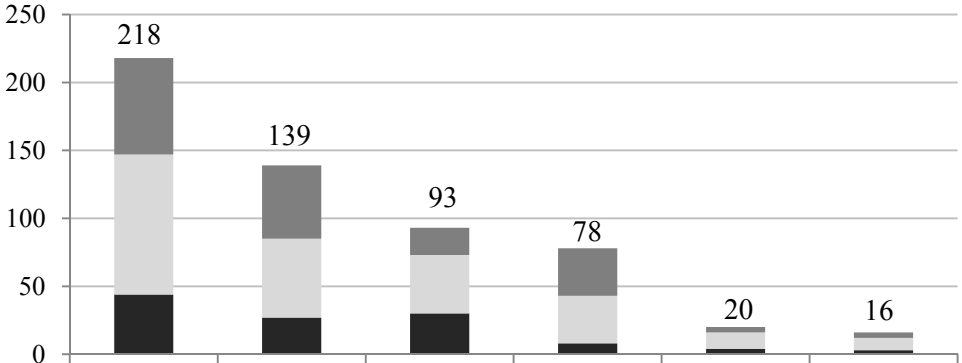
Summary of Illustrate Category

The Illustrate category, through fourteen subcategories and almost half of the coding mentions collected in this study, examines the need to illustrate the open space planning process, whether from an analysis or implementation perspective or from a practical or theoretical perspective. Overall, the subcategories overall ranking averages (between 2.9 and 4.4) suggest these processes are either elements these planners or articles suggest be done or should be done within an integrated open space planning process. Note the two categories with the highest Likert scale metric averages – Increases Connectivity with the Landscape and Transparent Nature – also had some of the lowest number of coding mentions within this category (n = 15 and n = 22, respectively).

Yet, the planning process is insufficient if people are engaged and shown how to address the planning issues – there must also be perseverance on the side of the planners, political process, and public if integrated open space planning is truly possible. This leads to our final core category: Commit.

**Category: Commit**

The category Commit has six subcategories that arose from the data. Five hundred sixty-four coding mentions were categorized into these six subcategories. Figures 18 and 19 show the number of coding mentions and average median rankings from the Likert Scale metric for each subcategory. This category demonstrates the level of commitment that planners, the public and politicians must have to the open space planning process. The fourteen subcategories are discussed below, with a summary at the end of this section that identifies cross-category topics.




| | Priority and Decision Making Process | Systems Thinking | Planner's Role* | Adapt-ability | Keep efforts focused | Persever-ance |
|---|---|---|---|---|---|---|
| Literature | 71 | 54 | 20 | 35 | 4 | 4 |
| Green Infrastructure | 103 | 58 | 43 | 35 | 12 | 9 |
| CEDAR | 44 | 27 | 30 | 8 | 4 | 3 |

Figure 18: Coding mentions by the participant groups, categorized by category and subcategory for the category Commit. Data labels on top of each column indicate the total coding mentions for each subcategory.

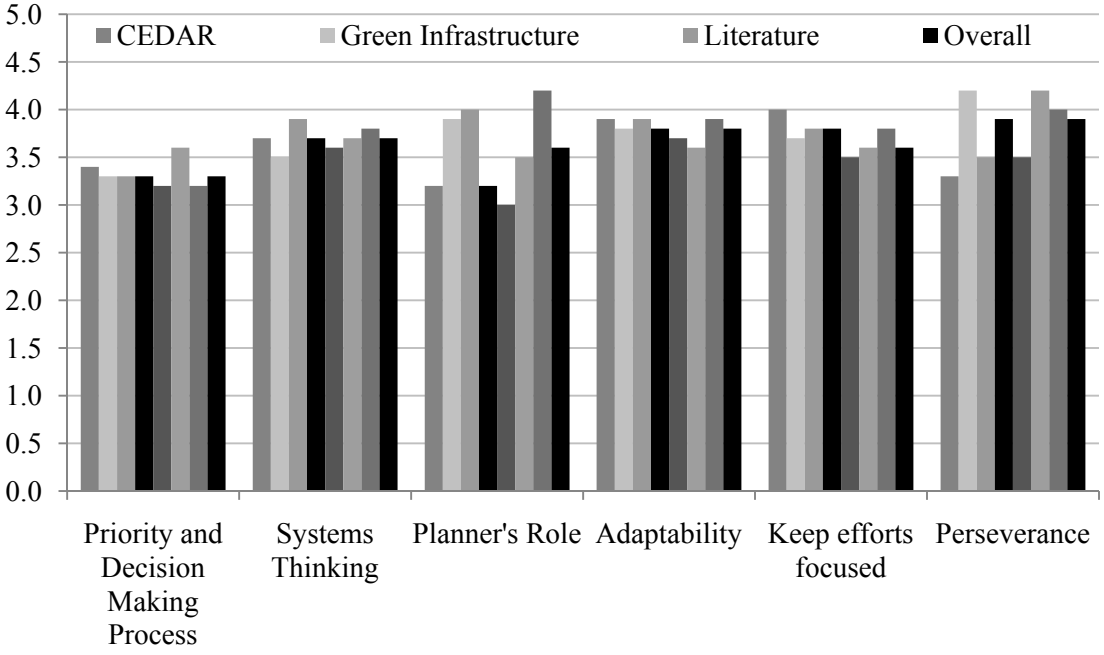



Figure 19: Average median rankings of the varying participant groups by subcategory for the category Commit.

Adaptability

Ten of the fourteen interview participants and thirteen articles had coding mentions within this subcategory (n = 78). This subcategory had median rankings of 3.7 for the CEDAR participants, 3.6 for the Green Infrastructure participants, 4.5 for the literature, and an overall average median of 3.9. The distributions within the groups did not differ significantly (Mann–Whitney $U = 60.5$, $n = 24$, $P = 0.486$ two-tailed).

Four general areas were derived from the data (three of which became topics): innovation and risks, model adaptability, process adaptability, and species adaptability. Comments in this Innovation and Risks topic Area revolved around the need for innovation, fresh-thinking, and creativity when approaching these integrated, complex planning processes (GI5; GI7; Carter and Fowler 2008; Day 2006; Nelson 2006) as well as the need for risk-taking (CE1, CE4, GI2; Carter and Fowler 2008; Cutchin 2007; Sagalyn 2007). Examples of each of these statements are as follows:

> So, in that case, getting somebody outside of this topic specialty has been very valuable, because they look at it in a fresh way, and bring other processes and ways of fostering community leadership to the table. So it's not just us talking to ourselves all the time. (GI5, Page 6, Coded as Outside feedback/creativity, Rank of 4).

> Innovative and effective policies and programs will be required to stem the tide of increasingly land-consumptive development (Bengston, Fletcher, and Nelson 2004, Page 282, Coded as Innovation, Rank of 5).

> To move their projects forward, public officials must be promoters, advocates and risk takers (Sagalyn 2007, Page 13, Coded as Public officials must be willing to take risks, Rank of 5).

Many of the interviewees in the Model Adaptability topic Area noted the adaptability of their own model, and even the evolution of the model in their own minds as they have practiced the model (CE1, CE2, GI2, GI8). Specific comments include the following:

> And, the GI model is, I can say it's fairly portable in terms of our methodology work and in a variety of different landscapes at a variety of different scales (GI2, Page 2, Coded as Adaptability of Model, Rank of 3).
>
> Seemingly a tangible flexible approach usable anywhere and at any scale, it offers promise for achieving a positive trajectory or even a successful result (Forman 2008, Page 253, Coded as Need for a flexible approach usable at any scale, Rank of 4).

Two areas within this topic were identified: the adaptability of the process itself (Botequilha Leitão and Ahern 2002; Carter and Fowler 2008; Merenlender et al. 2004; Nassauer and Opdam 2008; Nelson 2006) and the need for the practitioners and participants to be adaptable (GI2, GI9; Sagalyn 2007). Examples of coding mentions under this topic area are as follows:

> Certainly within your planning process, a couple of caveats – you need to always acknowledge that these are iterative plans (GI2, Page 23, Coded as Plans change, Rank of 5).
>
> You'd asked me before about setting priorities, but a lot of these are external factors, that come at you, that you really can have the best strategic plan in the world but as things evolve you have to be flexible, and figuring out which things are important and which things aren't takes, kind of, you know, a lot of experience, so it's good to have the same people around to learn all the lessons (GI9, Page 27, Coded as Flexibility, Rank of 5).
>
> Full implementation of this model requires that scientific methods make connections between the phases, and also that these methods adapt to collaborative research (Nassauer and Opdam 2008, Page 641, Coded as Use of this model requires the ability to adapt, Rank of 5).

The eight coding mentions not categorized into a topic area include a discussion on the ability of species to adapt (Polasky et al. 2005; Riley et al. 2003). A specific example of these statements is best highlighted by Riley et al. (2003):

> Animals most exposed to urban areas may also gain familiarity with roads and develop the ability to safely navigate them (Riley et al. 2003, Page 574, Coded as Species – adaptation to urban areas).

Keep Efforts Focused – Set Goals First

The comments under this subcategory can be classified as the use of goals to determine starting points and influence the overall process. This subcategory had twenty coding mentions and median rankings of 3.5 for the CEDAR participants, 3.6 for the Green Infrastructure participants, 3.8 for the literature, and an overall average median of 3.6. The distributions within the groups did not differ significantly (Mann–Whitney $U = 5.5$, $n = 8$, $P = 0.683$ two-tailed). Specific examples of comments are as follows:

> So, kind of, another best practice is really thinking strategically and writing a strategic plan from the beginning of what you think you're going to get, what type of tool do you think that city is going to use in the end (CE3, Page 17, Coded as Think Strategically, Rank of 4).

> It is important before selecting or prioritizing policies in the watershed that the jurisdiction clearly defines the goals it wants to accomplish (Carter and Fowler 2008, Page 159, Coded as Set goals first, Rank of 4).

> I like to say that you need to think about the end at the beginning, which is that at the beginning of the planning process, you need to think about your outcomes at the end will want to be, in terms of goals and also in terms of deliverables. At the outcome of this planning process, do you want a 70-pg report, do you want an interactive website, do you want a poster? You know what is the product going to be, um, because the product is going to also influence what kind of planning process you're going to run, what kind of public process you're going to run, all that sort of stuff. And I think sometimes people think that they go through a planning process and then they think at the end, oh maybe we should do a report. You need to have a pretty detailed idea of what you're deliverable is going to be, almost on the first day, almost like you're going to have an outline of your report before you run the planning process (GI2, Page 23, Coded as Set goals first, Rank of 5).

Perseverance

Five interview participants and two articles had coding mentions within this subcategory (n = 16). This subcategory had median rankings of 3.5 for the CEDAR participants, 4.2 for the Green Infrastructure participants, 4.0 for the literature, and an

overall average median of 3.9. The distributions within the groups did not differ significantly (Mann–Whitney $U = 4.5$, $n = 7$, $P = 0.839$ two-tailed).

Two areas were brought up within this subcategory: perseverance as an individual or an organization (CE1, CE2, GI7, GI8, GI9; Merenlender et al. 2004) and that projects are complex (CE2, GI7; Sagalyn 2007). The following quotes best illustrate this category:

> It normally doesn't just glide right through. And, so we have to be very patient in continually knowing and expecting to educate people, even though we've done it once, we've done it twice, we do it for the workshop – we have to keep repeating ourselves, in hopes that this won't be a long and drawn out process (CE2, Page 18, Coded as Perseverance, Rank of 4).

> This is going to sound a little hokey, you know, but resilience. And you know, again, if you are going to be working on these things for a long time I think you are going to be more effective when you have some staying power, if it's really getting high from successes and then not getting that low from failures (GI9, Page 27, Coded as Individual Resilience, Rank of 4).

> Commitment to such a partnership means working through the inevitable problems that bedevil implementation (Sagalyn 2007, Page 14, Coded as Commitment is needed to complete a public/private development project, Rank of 3).

Planner's Role

Thirteen interview participants and eight articles had coding mentions within this subcategory (n = 93). This subcategory had median rankings of 3.0 for the CEDAR participants, 3.5 for the Green Infrastructure participants, 4.2 for the literature, and an overall average median of 3.6. The distributions within the groups did not differ significantly (Mann–Whitney $U = 21.0$, $n = 19$, $P = 0.092$ two-tailed), though note how the interview participants saw less value in the role of planners than the literature did.

Three areas of discussion were recorded in this subcategory: the role of knowledge, a planner's ability to engage, and the technical role of the planner. In the role

of knowledge, planners' role includes that of an educator (CE1, CE2, GI2, GI4) and someone with broad-based knowledge (GI7, GI8, GI9; Brabec, Schulte, and Richards 2002; Zipperer et al. 2000). Examples include the following statements:

> It normally doesn't just glide right through. And, so we have to be very patient in continually knowing and expecting to educate people, even though we've done it once, we've done it twice, we do it for the workshop – we have to keep repeating ourselves, in hopes that this won't be a long and drawn out process (CE2, Page 18, Coded as Education, Rank of 4).

> It's kind of more about the ethic, you know, you do what you need to do based on your resource at hand in the community that you're working in and finding solutions that fit. It's mostly about the ethic and having a broad-minded approach and being able to work with other people (GI7, Page 31, Coded as Broad-minded approach, Rank of 5).

When discussing a planner's ability to engage, many of the coding mentions focused on planner's as advocates and leaders in this new era (GI7; Downs 2005; Jepson 2004; Nelson 2006) and the need for people skills (CE1, CE4, GI5, GI6, GI7, GI8). Examples include the following statements:

> I would say the other thing is that, in collaboration, practitioners really need to have skills, people skills and because someone is difficult or has awkward positions, it doesn't matter, you need to be able to incorporate that person and have a successful interaction and outcome. That's a skill set that not a lot of people, um, think is key. It's almost as important as knowing the topic (GI5, Page 21, Coded as People skills, Rank of 5).

> This indicates that it is possible for planners to stretch their roles in local government so as to be advocates and catalysts with respect to wider range of issues than just those that are directly related to land use planning and regulation (Jepson 2004, Page 237, Coded as Planners serve multiple roles, Rank of 3).

While the theoretical lens discussed in the literature review suggested that planners are moving beyond the rational planning model (with its emphasis on technical planning), many of the interview participants (CE1, CE2, CE4, GI5, GI6, GI7, GI8, GI9) and the literature (Hansen et al. 2005; Jepson 2004; Nelson 2006) still saw a role for

technical information in the planning profession. Though, two interview participants cautioned against playing too much of a technical role (CE2, CE4). Examples are as follows:

> It's all data that's out there, it's all scientific data that we engage a community in – we have to take it to the next level, we have to do/review reports. We have to understand current studies that have been done. Again, that just leads to an effective analysis process. Because again, all mapping, people will really resort to mapping, too much now (CE1, Page 29, Coded as Planner's Role – bring in relevant documents, Rank of 3).

> I think we can provide some technical information, but in terms of creating and crafting solutions, I think more listening than it is teaching. And that's really important (CE4, Coded as Planners as Providers of Technical Information, Rank of 4).

Priority and Decision Making Process

All fourteen interview participants and eighteen articles had coding mentions within this subcategory (n = 218), This subcategory had median rankings of 3.2 for the CEDAR participants, 3.6 for the Green Infrastructure participants, 3.2 for the literature, and an overall average median of 3.3. The distributions within the groups did not differ significantly (Mann–Whitney $U = 98.0$, $n = 32$, $P = 0.236$ two-tailed).

While several authors and interview participants noted the tradeoffs associated within decision making (CE2, GI6; Haight, Snyder, and Revellet 2005; Murphy 2001), others noted the increasing complexity in decision making (Brabec, Schulte, and Richards 2002; Nassauer and Opdam 2008). Overall, this subcategory had five main themes arise from the data: consensus, ecology as priority setters, the role of the public and stakeholders, social processes, and tools for prioritizing.

In the discussion on consensus, participants or authors either discussed consensus as a tool for decision-making (GI7; Regan, Colyvan, and Markovchick-Nicholls 2006) or

the lack of consensus on how to address these complex planning issues (Botequilha Leitão and Ahern 2002; Daniels and Lapping 2005; Downs 2005; Jabareen 2006). When discussing ecology as the priority setting objective for a planning effort, authors and the interviewees discussed the use of focal species (GI2, GI3, GI9) and the protection of riparian areas for both habitat value (GI9; Murphy 2001) and economic value (Bowman, Thompson, and Colletti 2009). A complete list of the ecological themes used for setting priorities can be found in Table 15.

The role of the public and stakeholders as either decision makers or priority settings appeared to depend on the interview participant, author, and project setting. Social processes driving the decision making process were focused on the distribution and quality of the experience (GI5) or the mapping exercises (GI1). Finally, in the tools

Table 15: A complete listing of ecological considerations and priority factors when making decisions. Note how participants and authors used multiple prioritization options for their planning efforts.

| **Prioritization Purpose** | **Participant** |
|---|---|
| Vulnerability/Irreplacability of a landscape or species | GI1, GI5; Haight, Snyder, and Revellet 2005 |
| Riparian areas or water resources | GI1, GI5, GI9; Bowman, Thompson, and Colletti 2009; Murphy 2001 |
| Interface areas | CE3 |
| Focal species | GI2, GI3, GI9 |
| Hot spot/cold spot preservation | Conway and Lathrop 2005 |
| Core habitat | GI2 |
| Corridor needs | GI2 |
| Ecological models | GI2, GI3, GI5, GI9; Stoms 2000 |
| Opportunities for protection | GI2 |
| Buffers | GI2; Brabec, Schulte, and Richards 2002 |
| Species or landscape diversity | GI9 |
| Connectivity between landscapes | GI2, GI9 |

for prioritizing discussion area, the CEDAR process appeared to have a more set process (based on the frequency of ideas mentioned in their workshop process), whereas the Green Infrastructure participants and the literature appeared to be more flexible. Specific examples of each of these topic areas include the following statements:

> The curves showing trade-offs between species representation and public access had concave shapes in which species representation dropped at an increasing rate as public accessibility increased (Haight, Snyder, and Revellet 2005, Page 332, Coded as Tradeoffs between objectives, Rank of 3).
>
> But, you know, when thirty people say, this is a great place to bring your dog, then things like that, these communities assets/values and if you then put that on a map too, then you begin to see the layer or the level of overlay (CE1, Page 26, Coded as Frequency of open space types leads to higher value, Rank of 3).
>
> Because ultimately what you map is basically what's important (GI4, Page 4, Coded as What you map is what is valued, Rank of 5).
>
> We certainly look at the distribution and that's what I'm talking about – the distribution of experience of nature; it doesn't have to be the distribution of community parks or regional parks, but we look for gaps, we're particularly sensitive to low-income or ethnic diversity, where there is no experience of nature to be had in sight (GI5, Page 17, Coded as Distribution of experiences, Rank of 4).
>
> But it's amazing how little data we actually have to make decisions on. Um, when you actually kind of start looking at uh, at the depth of the data and the science and, um, it's, there's a lot of shortcomings, and so, I would suggest that probably the predominance of our decisions comes out of the different negotiations or stakeholder involvement processes or community participation processes… the negotiation process is probably more important than the science in most situations that I'm involved in (GI7, Page 25, Coded as Decisions come from negotiations, Rank of 4).

### Systems Thinking

This final subcategory within the Commit category highlights the need for broader thinking patterns than those discussed in the Pressures core category. All fourteen interview participants and nineteen articles had coding mentions within this

subcategory (n = 139). This subcategory had median rankings of 3.6 for the CEDAR participants, 3.7 for the Green Infrastructure participants, 3.8 for the literature, and an overall average median of 3.7. The distributions within the groups did not differ significantly (Mann–Whitney $U = 119.0$, $n = 33$, $P = 0.589$ two-tailed).

Three areas are discussed within this subcategory: how the meshing of ecological and social systems are necessary for landscape integrity, how plans and professions need to be cross-linked, and tools or processes that promote systems thinking. Many of the interviews and literature studied in this research effort highlighted the need for sustainable ecological and social landscapes (CE1, CE2, GI1, GI2, GI5, GI6, GI7, GI8; Bengston, Fletcher, and Nelson 2004; Botequilha Leitão and Ahern 2002; Forman 2008; Nassauer and Opdam 2008; Zipperer et al. 2000). Additionally, the need to link with other plans and disciplines was also well discussed (GI3, GI4, GI5, GI7, GI9; Bryant 2006; Lee and Moudon 2004; McMillan 2005; Merenlender et al. 2004; Nassauer and Opdam 2008). Finally, the tools to foster systems thinking that were mentioned within the collected data include community gardens (Armstrong 2000), environmental mitigation (Brody, Carrasco, and Highfield 2006), practical ecological knowledge (Thompson 2004), sustainable development (Berke 2002), and regional trails and greenways (Bryant 2006).

Each of these areas is highlighted in the following statements:

> So, one of the strengths that using this approach we get to unify and crystallize the discussion regarding open space or green infrastructure or however a particular community, you know, wants to call it. To me, that's the single biggest strength of this process (CE2, Page 11, Coded as Systematic process, systems thinking, Rank of 5).

> [Green Infrastructure is] an interconnected series of public and private lands that's at a landscape scale and focuses on conserving ecologically significant areas as

> well as areas that are important to people, for the betterment of both humans and wildlife (GI2, Page 2, Coded as Systems Thinking, Rank of 3).
>
> And we need to participate in things like, what makes a livable community and what makes retail successful. It's not street trees, sorry, but it's not. So we need to know what our topic is and what are topic isn't and put it forward with strength. (GI5, Page 22, Coded as Need to see from a systems perspective, Rank of 5).
>
> In this case, not only has the interviewee gained ecological and practical knowledge, she has replaced a purely aesthetic cultural model of landscaping with one that includes prairie ecology as an important component (Thompson 2004, Page 149, Coded as Practical knowledge fostered systems thinking, Rank of 3).

### Summary of Commit Category

The Commit category, through six subcategories, examines the need to persevere within the planning process, using multiple tools, decision-making processes, and systems thinking to meet the needs of today's ecological and social challenges. Overall, the subcategories overall ranking averages (generally between 3.2 and 3.9) suggest these processes are either elements these planners or articles suggest be done or strongly suggest should be done within the open space planning process.

## Findings: State of Integrated Open Space Planning

In summary, these three core categories, six categories, and thirty-six subcategories support the creation of a grounded theory framework (Figure 20) that is related to the Pressure-State-Response framework. In this research, there are pressures that both inhibit and facilitate the movement toward more integrated forms of open space planning. The State is composed of three main categories: engage, illustrate, and commit. Next, the response, or research directions, is discussed.

Supporting this framework are over three thousand, four hundred open coding mentions (see Figure 20). The use of triangulation of both data sources (interviews and

the literature) and methods (grounded theory and the Likert scale metric, see Figures 20 and 21, respectively) have allowed this grounded theory to become theoretically saturated in the concepts and begin to build a framework around which integrated open space planning processes, and landscape integrity, can build.

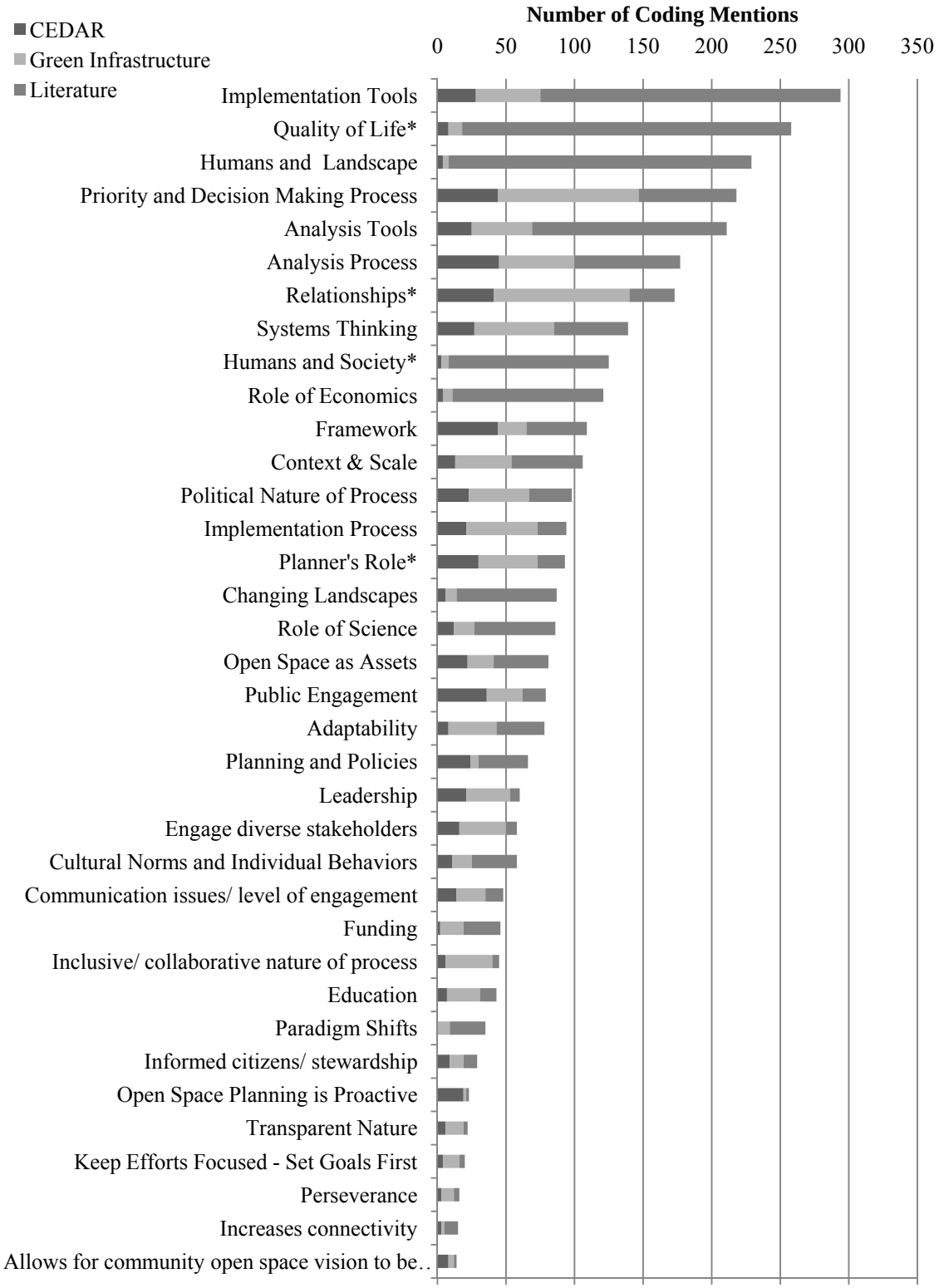



Figure 20: The total number of coding mentions by subcategory for all of the Pressure and State core categories. A (*) after the name of the subcategory indicates a statistically different mean between the literature and the interviews.

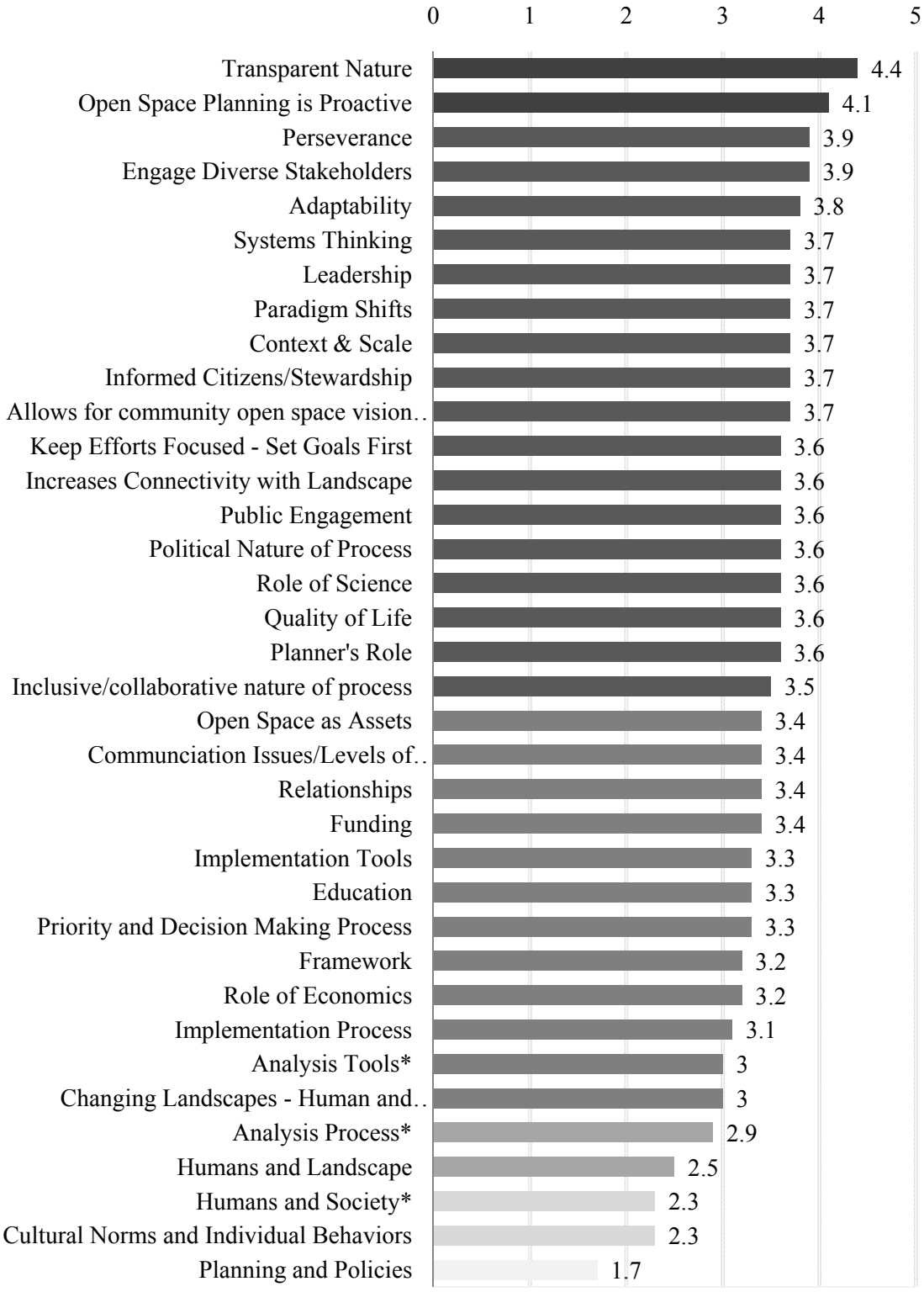



Figure 21 The results from the Likert metric scale coding efforts, categorized by subcategories.

# CHAPTER V

# DISCUSSION – TOWARD A RESPONSE FOR INTEGRATED OPEN SPACE PLANNING

*"…developing challenging new conceptual skills is hard work. It requires a level of patience and perseverance absent from most team improvement efforts. On the other hand, where such capabilities begin to develop in concern with the other disciplines, the results are dramatic, and invariably the appetite for more progress grows stronger."*

– Peter M. Senge (1990, xix)

The field of open space planning is beginning to move away from the dichotomy of either being focused on social or ecological planning (Maruani and Amit-Cohen 2007), to a planning process that integrates these notions under one plan (see Theoretical Lens, Chapter II). This study created a conceptual framework to bridge what have been traditionally separate efforts – ecologically- and socially-based open space planning (Maruani and Amit-Cohen 2007). For the first time in the field of integrated open space planning, ecological and social efforts are united under a comprehensive framework that crosses practical and theoretical boundaries.

To begin to address this thesis' research questions, this research has framed the state of integrated open space planning within an adapted Pressure-State-Response framework (Berry 1998) to illuminate the forces either pushing (encouraging) or pulling away from (inhibiting) more integrated forms of open space planning, to highlight current practices and processes that open space planning practitioners and researchers are using, and to suggest potential responses for how integrated open space planning can move forward in a more institutionalized manner in the hopes that landscape integrity can be achieved.

More specifically, this research identified pressures that served as both barriers and facilitators to integrated open space planning. Specific barriers included the homogenization of species across urban areas, insufficient planning and policies to address complex and dynamic modern problems, and the reactive nature of the planning process. Not surprisingly, categories that were considered barriers also had the lowest average medians on the Likert metric (ranging from 1.7 to 2.5, see Figure 21, page 152), indicating these subcategories are concerns both to interview participants and the reviewed literature.

By contrast, two pressures were seen as forces pushing practitioners toward integrated open space planning: 'changing landscapes' and 'paradigm shifts.' 'Changing landscapes' refers to the way rapidly changing landscapes are forcing practitioners and researchers to be more innovative and integrative. 'Paradigm shifts' refers to the need to see the world in a fundamentally new way, including new roles for planning and science and increased optimism in practitioners' work. Though only one hundred twenty-two coding mentions were recorded for this category (out of 3,451 in the study, or 3.5%), mentions were recorded from eleven out of the fourteen interviews and thirty-one out of fifty-five articles, indicating their pervasiveness in this research.

The state of integrated open space planning had the majority of the grounded theory coding mentions (2,851 out of 3,451, or 82.6%) and was categorized into thirty subcategories and three overarching categories: Engage, Illustrate, and Commit. The thirty subcategories highlight a range of tools, practices, and processes that practitioners and the literature are employing in studies aimed at understanding or achieving landscape integrity. These tools, and the opinions and experiences practitioners and the literature

have expressed about them, can inform practitioners as they attempt to practice integrated forms of open space planning within their own community or region.

## Limitations of This Study

Prior to delving into the potential responses for the field of integrated open space planning, the limitations of this study are explored. While it might be ideal to assume the findings in this study have worldwide applicability, it is naïve to suggest as much. As Kirk and Miller discuss, perfect validity can never be achieved (1986). While every attempt has made to limit the number of errors within this study, there are still limitations that should be discussed.

The first of these limitations is the reliability of the Likert scale metric and coding process. While this study did achieve intercoding reliability through the test between this researcher and the study's major professor, multiple checks for inter-observer agreement could have been conducted throughout the process to ensure the accuracy of the metric and coding process remained reliable (Christensen personal communication 2010).

Any grounded theory or model representation is just that – a representation of what was said – in this thesis, almost three thousand, six hundred coding points have been summarized from one thousand, one hundred ninety-seven pages of research (three hundred eighteen pages of transcriptions and eight hundred seventy-nine pages of literature) and three core categories – certainly this aggregation can preclude us from seeing the most complex picture possible. At the same time, the use of multiple methods and multiple data sources to achieve triangulation (Denzin and Lincoln 2000) and theoretical saturation (Glaser and Strauss 1967) have minimized data subjectivity and

allowed for the most salient points to rise to the level of core category, category, or subcategory level within this study.

In addition, there should be some concern stated for bias regarding the CEDAR and Green Infrastructure models, as the practitioners of these models were the ones interviewed. However, the high degree of similarity between the interviews and the literature (thirty-three out of the thirty-six categories having statistically similar means on the Likert scale metric), as well as the sampling of multiple practitioners within each field may help to negate this bias. Still, several categories proved to be dominated by either the interview participants or the literature only, e.g., the subcategories within the Built Environment category. This can partially be explained by the fact that this researcher's data collection tool (the questionnaire) did not ask many questions that focused on what limits they saw within the planning process. Additionally, it would be expected that the practitioners studied within this research, as practitioners of innovative models, would not be as embedded within the inhibiting pressures (built environment or the disconnect) associated with this framework. In other words, if they are able to practice their form of open space planning, these barriers for most communities may not serve as limiting factors.

## Limits to the Models and Process

In addition to the limitations of the study, several of the interviewees noted limitations within their own model that should be highlighted for a complete perspective of each model to be gained. One of the limitations of the CEDAR method that was discussed was the lack of a more comprehensive toolbox for implementation (CE3, CE4) and one participant mentioned its inability to lead to implementation (CE5). As CE5

notes, “It’s a great conversation starter, but it’s not a finisher” (page 12). Within the Green Infrastructure model, participants noted the lack of engagement of diverse stakeholders in the process (GI3) and that the model is “overly fluffy” (GI1) in that the plan did not lead to implementation. At the same time, other participants discussed higher degrees of success in achieving implementation (CE2, GI2, GI5, GI7, GI8, GI9).

One additional limit appears to be the role of consultants in these integrated forms of open space planning efforts. As the core category “Commit” illustrates, perseverance, adaptability, and systems thinking are strong components of an integrated open space planning effort. The short-term involvement on the part of some consultants can limit the ability of communities to fully implement their plans. As GI4 notes,

> So in most cases, the work that we do it’s up to the client to do the implementation. And, so, the success of the implementation I would say, to a certain degree, is um, whether the client has a really clear vision as to how they are going to use the maps (GI4, Page 11, Coded as Concern: Role does not include implementation, Rank of 2).

In addition to the disconnect between analysis and implementation, it should be noted that participant selection to participate within this research effort was only limited by those individuals who did not respond to the researcher. Put more simply, there were not many more practitioners in the Western United States from which to sample, though the planners within this study did have a combined two hundred forty-seven years of planning experience, indicating that the individuals who did participate are not want for experience and depth of knowledge. Further, while more practitioners could have been selected had this study focused nationally, the point remains that the majority of planning practitioners are not using these planning models, or their use of their own model is not documented in such a manner upon which research can be conducted.

## Implications of This Study

As discussed in the Introduction of this thesis, several researchers have called for different methods to be examined across similar contexts (Reed 2008; Ryan, Fábos, and Allan 2006; Tippett, Handley, and Ravetz 2007). This research rose to this challenge by documenting practical and theoretical knowledge across two research paradigms, qualitative (grounded theory) and quantitative (Likert scale metric). From complex understanding on the state of integrated open space planning efforts, these research findings have synthesized a consistent body of knowledge, from both quantitative and qualitative perspectives.

Within this multi-faceted research effort, what began as an exploration to identify specific tools, instead became a journey to discover a complex and holistic perspective on integrated open space planning. This thesis suggests that practitioners of the emerging models of integrated forms of open space planning are well-aligned with the research. Both the grounded theory and the Likert scale metric confirmed this similarity with thirty-two of the thirty-six categories being statistically similar through the Mann-Whitney *U* test analysis.

In addition to the soundness of these research findings, this thesis indicates multiple practitioners are making the shift that so many researchers have discussed only in the literature (Beatley 1995; Rees 1995; Rosenberg 1986) but has been documented in two, more recent studies in their respective fields of natural resource management and climate change (Armitage et al. 2009; Hagerman et al. 2010).

While this study noted that planners must be adept, and show they are adept, at engaging with multiple levels of participants across the planning process - they are not

necessarily engaging well with each other. Some of this is explainable by the wide distribution of these planners across the Western United States. However, the recent emergence of more institutionalized networks for these planners is cause for optimism that this will soon change. Two of these emergent networks include the formation of the Green Infrastructure Community of Practice (Coelho 2010) and the American Planning Association's Sustainable Places Initiative (American Planning Association 2010). These emergent areas can not only bring practitioners together to help each other reinforce the ideas discussed in this research, but they will help to provide the commitment to exploring these concepts (one of the key tenets found in this study) that a single thesis can never achieve.

## Continuing Research

As illustrated in the core categories, this thesis has developed a rich and complex understanding of integrated open space planning. However, in addition to the areas of confluence, it is also necessary to discuss areas where the literature and the interviews were different to highlight potential research projects, as well as additional areas within this research that require further probing to more clearly understand the implications suggested in this thesis.

### Gaps Between the Interview Participants

Two areas of differences within the interviews may suggest further research. First only one interviewee said that science led the planning process. While this interview participant study was one of the most well-funded planning effort discussed by a participant, it could prove interesting to understand why and how science came to play

such a large role in this effort and how others can learn to incorporate more science into their efforts. One solution has been suggested by Nassauer and Opdam (2008) where they demonstrate that design could be the missing link in the pattern: process framework of landscape ecology.

A third point of discussion within the differences between the interview participants is that distinct differences between interviewees from coastal landscapes and the Intermountain West could be seen. For instance, one participant in the Pacific Northwest noted the extensive support her efforts receive from the existing planning framework. Others from coastal landscapes echoed these concepts. In contrast, the majority of the participants are from the Intermountain West, which has been traditionally seen as having less supportive cultural models for integrated open space planning (see, for example, the interview with participant CE3 or GI3). One specific example of this difference is in the subcategory "Paradigm Shifts," where CEDAR participants did not have any coding mentions, and of the GI participants who commented in this subcategory, only one hails from the Intermountain West. As this finding was only seen as a pattern in this study, and was by no means the focus, additional investigations could identify whether this paradigm shift is occurring in the Intermountain West, and if so, how it can be expanded to more areas.

**Gaps Between the Interviews and the Literature**

Differences were also present between the practitioners and the theory, though to a much lesser degree than originally expected by this researcher. As noted above, thirty-two out of the thirty-six subcategories were not statistically different. Thus, from both a qualitative and quantitative perspective, this thesis identified a generally consistent body

of knowledge between practitioners (in this study) and the theory. With that said, a few areas of incongruence can be identified. First, the literature did not mention the notion of a willing community as a requirement for an integrated open space planning effort to occur, whereas several interview participants felt strongly about this topic (CE1, CE2, CE3, GI2, GI3). The concept of a willing community is consistent with one recent sociological study that tentatively suggests notions of community within a given place are cyclical, in that "the community field emerges and recedes" and more research is needed to "understand how social structure emerges, changes, and recedes, and how that relates to collective action" (Allen et al. 2008, 48). This research suggests the notions of timing discussed by one interview participant (GI7) and this study (Allen et al. 2008) indicates not all communities are ready for advancing landscape integrity at any given time. However, further research is needed to tests these notions of community readiness.

While well-documented in the literature, the interview participants rarely discussed social equity (only two coding mentions were documented from the transcripts). This could be due to the structure of the interview data collection tool (questionnaire) in that questions focused on ecological and social frameworks as opposed to more specific topics, such as equity. At the same time, the nature of open-ended questionnaire should "allow for serendipitous content to emerge" (Allen et al. 2008, 47) and the most important topics, to the participants, to be discussed. Future research could test the level of understanding of participants in concepts of social equity. Such a study could adopt a similar framework to this research effort, focusing on identifying similarities and gaps in knowledge between the practitioners and theory to test whether this difference is limited only to this sampling population or is more pervasive.

**Overall Knowledge Gaps**

One of the authors in this study indicated a need to understand the barriers to implementation (Thompson 2004). While Brody, Carrasco, and Highfield (2006) has conducted an extensive study of sprawl-reducing policies in Florida, a broader perspective and deeper understanding of these issues is needed if we truly want to be proactive in our open space planning efforts. Miller et al. (2009) found that lack of a specialist in ecological planning, science-based information, and lack of institutional and governmental support were barriers to implementing biodiversity conservation tools in three geographic areas in the United States. Adapting the methods of Miller et al. (2009) to integrated forms of open space planning could begin to illustrate the barriers municipalities and regions face for implementation. If the lack of knowledge and specialists on staff are some of the main barriers to implementing conservation biodiversity, these same elements may be present as barriers to implementation in integrated open space planning. If this is indeed the case, this also would point to a clear direction for the Green Infrastructure Community of Practice and the American Planning Association's Sustainable Places Initiative (see discussion above) to address.

One intriguing area for future research could include assessing the difference between the practitioners' perspectives identified within this research to perspectives from the communities in which the CEDAR or Green Infrastructure plans have been developed. Questions could include how city planners, elected officials and project champions/general public view these planning efforts and whether these plans lead to informed citizenry and/or greater stewardship. While other studies have found little difference in plans that acknowledge sustainability and those that do not (Conroy 2000;

Conroy and Berke 2004), researchers could test these authors' findings in the field of integrated open space planning.

The transition from analysis to implementation has always been discussed as difficult. A focus group with the interview participants could generate ideas for how to increase implementation qualitatively and quantitatively to ensure landscape loss does not continue to increase. Research into how international models are addressing these issues, as well as others identified within this study, also could be examined.

Finally, the notions of adaptability and risk-taking within this research deserve further attention as they include one of the fundamental shifts away from the barriers identified within this research – the idea that we can no longer plan for a static world. While moving forward in light of uncertainty has always been a characteristic of the planning field (Kato and Ahern 2008), these authors also note that fear and risk-taking may be "perhaps the greatest challenge to implementing adaptive planning" (549). But these notions may be undergoing a shift. One example comes from Tasan-Kok (2008), where she notes that while "flexibility" was originally viewed as a weakness in planning, it is increasingly viewed positively as form of creativity. Nonetheless, more concrete ideas and practical tools are needed if adaptive management techniques are to become institutionalized.

One final acknowledgement is that even though these responses are the best they can be given the knowledge synthesized in this research and the recommendations provided by others, there is still uncertainty as to whether even these recommendations will assist humanity in reaching landscape integrity. This issue and the overall process journeyed through on this thesis are presented in Figure 22.

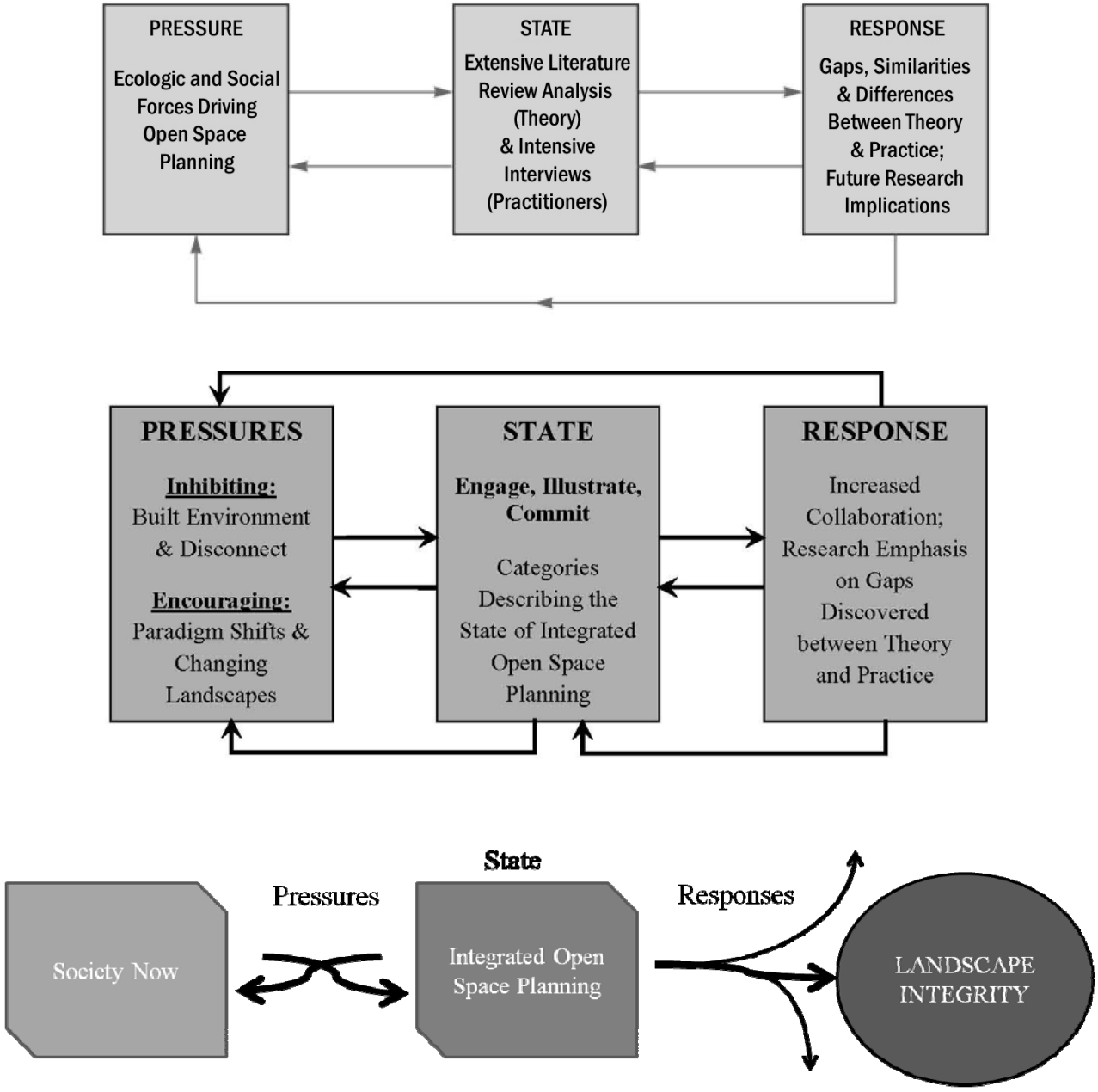



Figure 22: The evolution of this thesis. In the top figure, the thesis was organized under the Pressure-State-Response framework to provide structure to the argument and research process. In the second figure (middle), the results of the thesis are synthesized. In the final figure, a view from the outside of this study is proposed – where we acknowledge that integrated open space planning is not mainstream and thus, must look at the pressures that inhibit or facilitate this movement from where society is now. Finally, an examination of the responses to the state of integrated open space planning can lead us closer to landscape integrity is examined in this chapter. The arrows under the response title suggest that these responses are our best judgment on how to reach landscape integrity, even though they still may miss the mark (uncertainty).

# Closing Remarks

This study has highlighted two integrated open space planning models and a breadth of literature supporting a movement away from the community vs. conservation dichotomy so prevalent in society today (Agrawal and Gibson 1999; Koomen, Dekkers, and van Dijk 2008), with a premise to prepare a canvas upon which more specific, future research can paint. While this movement is not yet mainstream, both paradigm shifts and the rapidly changing landscapes in which we live are reinforcing this trend. With the expanded view and holistic framework illustrated by this research, planners are afforded a similar language upon which they can discuss the tools and processes central to integrated open space planning.

# REFERENCES

Abella, Scott R., John F. Jaeger, and Timothy A. Schetter. 2007. Public land acquisition and ecological restoration: An example from Northwest Ohio's Oak Openings Region. *Natural Areas Journal* 27 (1): 92-97.

Agrawal, Arun, and Clark C. Gibson. 1999. Enchantment and disenchantment: The role of community in natural resource conservation. *World Development* 27 (4): 629-649.

Ahern, Jack. 1991. Planning for an extensive open space system: Linking landscape structure and function. *Landscape and Urban Planning* 21 (1-2): 131-145.

———. 1995. Greenways as a planning strategy. *Landscape and Urban Planning* 33 (1-3): 131-155.

Albrechts, Louis. 2003. Reconstructing decision-making: Planning versus politics. *Planning Theory* 2 (3): 249-268.

Allen, John C., Susan E. Dawson, Gary E. Madsen, and Chih-Yao Chang. 2008. A social relationship response to a proposed coal-fired power plant: Network theory and community change. *Community Development* 39 (1): 35-49.

American Farmland Trust. 2010. *Farming on the Edge Report*. http://www.farmland.org/resources/fote/default.asp [15 April 2010].

American Planning Association. 2010. *APA's Sustaining Places Initiative*. http://www.planning.org/sustainingplaces/index.htm [14 April 2010].

Antrop, Marc. 2007. Reflecting upon 25 years of landscape ecology. *Landscape Ecology* 22 (10): 1441-1443.

Arendt, Randall. 2004. Linked landscapes: Creating greenway corridors through conservation subdivision design strategies in the northeastern and central United States. *Landscape and Urban Planning* 68 (2-3): 241-269.

Armitage, Derek R., Ryan Plummer, Fikret Berkes, Robert I. Arthur, Anthony T. Charles, Iain J. Davidson-Hunt, Alan P. Diduck, Nancy C. Doubleday, Derek S. Johnson, Melissa Marschke, Patrick McConney, Evelyn W. Pinkerton, and Eva K. Wollenberg. 2009. Adaptive co-management for social and ecological complexity. *Frontiers in Ecology and the Environment* 7 (2): 95-102.

Armstrong, Donna. 2000. A survey of community gardens in upstate New York: Implications for health promotion and community development. *Health & Place* 6 (4): 319-327.

Arnstein, A. 1969. A ladder of citizen participation. *Journal of the American Institute of Planners* 26: 216-233.

Asikainen, Eveliina, and Ari Jokinen. 2009. Future natures in the making: Implementing biodiversity in suburban land-use planning. *Planning Theory & Practice* 10 (3): 351 - 368.

Baert, Patrick. 2005. *Philosophy of the Social Sciences: Towards Pragmatism*. Cambridge: Polity Press.

Bailey, Kenneth D. 1982. *Methods of Social Research*. 2nd ed. New York: The Free Press.

Balram, Shivanand, and Suzana Dragicevic. 2006. Modeling collaborative GIS processes using soft systems theory, UML and object oriented design. *Transactions in GIS* 10 (2): 199-218.

Balram, Shivanand, Suzana Dragićević, and Thomas Meredith. 2004. A collaborative GIS method for integrating local and technical knowledge in establishing biodiversity conservation priorities. *Biodiversity and Conservation* 13 (6): 1195-1208.

Bates, Laurie J., and Rexford E. Santerre. 2001. The public demand for open space: The case of Connecticut communities. *Journal of Urban Economics* 50 (1): 97-111.

Beatley, Timothy. 1995. Planning and sustainability: The elements of a new (improved?) paradigm. *Journal of Planning Literature* 9 (4): 383-395.

———. 2004. *Native to Nowhere: Sustaining Home and Community in a Global Age*. Washington, D.C.: Island Press.

Benedict, M.A., and E.T. McMahon. 2002. Green infrastructure: Smart conservation for the 21st century. *Renewable Resources* 20 (3): 12-17.

———. 2006. *Green Infrastructure: Linking Landscapes and Communities*. Washington, D.C.: Island Press.

Bengston, David N., Jennifer O. Fletcher, and Kristen C. Nelson. 2004. Public policies for managing urban growth and protecting open space: Policy instruments and lessons learned in the United States. *Landscape and Urban Planning* 69 (2-3): 271-286.

Berger, A.R., and R.A. Hodge. 1998. Natural change in the environment: A challenge to the pressure-state-response concept. *Social Indicators Research* 44 (2): 255-265.

Berke, Philip R. 2002. Does sustainable development offer a new direction for planning? Challenges for the twenty-first century. *Journal of Planning Literature* 17 (1): 21-36.

———. 2008. The evolution of green community planning, scholarship, and practice: An introduction to the special issue. *Journal of the American Planning Association* 74 (4): 393-407.

Berry, David. 1998. Sustainable development in the United States: An experimental set of indicators. Washington, D.C.: US Interagency Working Group on Sustainable Development Indicators.

Bhat, Mahadev G. 2003. Application of non-market valuation to the Florida Keys marine reserve management. *Journal of Environmental Management* 67 (4): 315-325.

Blair, Robert, and Elizabeth Johnson. 2008. Suburban habitats and their role for birds in the urban–rural habitat network: Points of local invasion and extinction? *Landscape Ecology* 23 (10): 1157-1169.

Blumer, Herbert 1969. *Symbolic Interactionism: Perspective and Method*. Berkeley: University of California Press.

Bolitzer, B., and N. R. Netusil. 2000. The impact of open spaces on property values in Portland, Oregon. *Journal of Environmental Management* 59 (3): 185-193.

Boothroyd, Ian K.G., and Maree J. Drury. 2008. Mind the Gap! Frameworks for urban sustainability. In *The New Zealand Society for Sustainability Engineering and Science*, ed. Carol Boyle, Zoe Burkitt, Yasenko Krpo, Misty Mossman, Ir R. McDowall, John Peet, 1-9. Auckland, New Zealand.

Botequilha Leitão, André, and Jack Ahern. 2002. Applying landscape ecological concepts and metrics in sustainable landscape planning. *Landscape and Urban Planning* 59 (2): 65-93.

Bowman, Troy, and Jan Thompson. 2009. Barriers to implementation of low-impact and conservation subdivision design: Developer perceptions and resident demand. *Landscape and Urban Planning* 92 (2): 96-105.

Bowman, Troy, Jan Thompson, and Joe Colletti. 2009. Valuation of open space and conservation features in residential subdivisions. *Journal of Environmental Management* 90 (1): 321-330.

Brabec, Elizabeth, Stacey Schulte, and Paul L. Richards. 2002. Impervious surfaces and water quality: A review of current literature and its implications for watershed planning. *Journal of Planning Literature* 16 (4): 499-514.

Brandon, Katrina, Larry J. Gorenflo, Ana S. L. Rodrigues, and Robert W. Waller. 2005. Reconciling biodiversity conservation, people, protected areas, and agricultural suitability in Mexico. *World Development* 33 (9): 1403-1418.

Brody, Samuel D. 2003. Measuring the effects of stakeholder participation on the quality of local plans based on the principles of collaborative ecosystem management. *Journal of Planning Education and Research* 22 (4): 407-419.

Brody, Samuel D., Virginia Carrasco, and Wesley E. Highfield. 2006. Measuring the adoption of local sprawl: Reduction planning policies in Florida. *Journal of Planning Education and Research* 25 (3): 294-310.

Brown, Daniel G., Kenneth M. Johnson, Thomas R. Loveland, and David M. Theobald. 2005. Rural land-use trends in the conterminous United States, 1950 - 2000. *Ecological Applications* 15 (6): 1851-1863.

Brunckhorst, David, Phillip Coop, and Ian Reeve. 2006. 'Eco-civic' optimisation: A nested framework for planning and managing landscapes. *Landscape and Urban Planning* 75 (3-4): 265-281.

Bryan, Brett A., and Neville D. Crossman. 2008. Systematic regional planning for multiple objective natural resource management. *Journal of Environmental Management* 88 (4): 1175-1189.

Bryant, M. Margaret. 2006. Urban landscape conservation and the role of ecological greenways at local and metropolitan scales. *Landscape and Urban Planning* 76 (1-4): 23-44.

Carson, Rachel. 1962. *Silent Spring*. Boston: Houghton Mifflin.

Carter, Timothy, and Laurie Fowler. 2008. Establishing green roof infrastructure through environmental policy instruments. *Environmental Management* 42 (1): 151-164.

Carton, L. J., and W. A. H. Thissen. 2009. Emerging conflict in collaborative mapping: Towards a deeper understanding? *Journal of Environmental Management* 90 (6): 1991-2001.

Center for Green Space Design. 2010. *Center for Green Space Design*. http://www.greenspacedesign.org [1 April 2010].

Chace, Jameson F., and John J. Walsh. 2006. Urban effects on native avifauna: a review. *Landscape and Urban Planning* 74 (1): 46-69.

Charmaz, Kathy. 2000. Grounded theory in the 21st century: Applications for advancing social justice studies. In *Handbook of Qualitative Research*, ed. Norman K. Denzin and Yvonna S. Lincoln, 507-536. Thousand Oaks, CA: Sage Publications.

———. 2003. Qualitative interviewing and grounded theory analysis. In *Inside Interviewing: New Lenses, New Concerns*, ed. James A. Holstein and Jaber F. Gubrium, 675-694. Thousand Oaks, CA: Sage Publications.

Chase, Lisa, Daniel Decker, and T. Lauber. 2004. Public participation in wildlife management: What do stakeholders want? *Society and Natural Resources* 17: 629-639.

Chess, Caron, and Kristen Purcell. 1999. Public participation and the environment: Do we know what works? *Environmental Science & Technology* 33 (16): 2685-2692.

Clark, Roger N., and George H. Stankey. 1979. The recreation opportunity spectrum: a framework for planning, management, and research. Portland, OR: US Forest Service.

Clarke, Adele E. 2003. Situational analyses: Grounded theory mapping after the postmodern turn. *Symbolic Interaction* 26 (4): 553-576.

Coelho, Dana. 2010. *Green Infrastructure Community of Practice: Collaborative network of strategic conservation professionals*. http://greeninfrastructure.ning.com/ [28 March 2010].

Cohen, Deborah A., Sanae Inagami, and Brian Finch. 2008. The built environment and collective efficacy. *Health & Place* 14 (2):198-208.

Conroy, Maria Manta, and Phillip R. Berke. 2004. What makes a good sustainable development plan? An analysis of factors that influence principles of sustainable development. *Environment and Planning A* 36: 1381-1396.

Conroy, Maria Manta. 2000. Planning for sustainable development: A comparative analysis of the preparation and content of community comprehensive plans. Dissertation, The University of North Carolina at Chapel Hill.

Conway, Tenley M., and Richard G. Lathrop. 2005. Modeling the ecological consequences of land-use policies in an urbanizing region. *Environmental Management* 35 (3): 278-291.

Corbin, Juliet, and Anselm Strauss. 1990. Grounded theory tesearch: Procedures, canons and evaluative criteria. *Qualitative Sociology* 13 (1):3-21.

Corry, Robert C., and Joan Iverson Nassauer. 2005. Limitations of using landscape pattern indices to evaluate the ecological consequences of alternative plans and designs. *Landscape and Urban Planning* 72 (4): 265-280.

Cowling, Richard M., Shirley M. Pierce, and Trevor Sandwith. 2002. Conclusions: The fundamentals of mainstreaming biodiversity. In *Mainstreaming Biodiversity in Development: Case Studies from South Africa*, ed. Shirley M. Pierce, Richard M. Cowling, Trevor Sandwith and Kathy MacKinnon, 143-153.Washington, D.C.: World Bank.

Crawford, David, Anna Timperio, Billie Giles-Corti, Kylie Ball, Clare Hume, Rebecca Roberts, Nick Andrianopoulos, and Jo Salmon. 2008. Do features of public open

spaces vary according to neighbourhood socio-economic status? *Health & Place* 14 (4): 889-893.

Creswell, John W. 2003. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 3rd ed. Thousand Oaks, CA: Sage Publications.

Crewe, Katherine, and Ann Forsyth. 2003. LandSCAPES: A typology of approaches to landscape architecture. *Landscape Journal* 22 (1): 37-53.

Cutchin, Malcolm P. 2007. The need for the "new health geography" in epidemiologic studies of environment and health. *Health & Place* 13 (3): 725-742.

Cytron, Naomi. 2008. It's getting easier to be green: Cultivating the intersections between community development and environmental sustainability. *Community Investments* 20 (2): 3-7.

Czech, Brian, Paul R. Krausman, and Patrick K. Devers. 2000. Economic associations among causes of species endangerment in the United States. *Bioscience* 50 (7): 593-601.

Daniels, Thomas L. 2009. A trail Across time: American environmental planning from City Beautiful to Sustainability. *Journal of the American Planning Association* 75 (2): 178 - 192.

Daniels, Tom, and Mark Lapping. 2005. Land preservation: An essential ingredient in smart growth. *Journal of Planning Literature* 19 (3): 316-329.

Davidoff, Paul. 1965. Advocacy and pluralism in planning. *Journal of the American Institute of Planners* 31 (4): 331 - 338.

Davidson, S. 1998. Spinning the wheel of empowerment. *Planning* 3rd April: 14-15.

Day, Diane. 1997. Citizen participation in the planning process: An essentially contested concept? *Journal of Planning Literature* 11 (3): 421-434.

Day, Kristen. 2006. Active living and social justice. *Journal of the American Planning Association* 72: 88-99.

Denzin, Norman K., and Yvonna S. Lincoln. 2000. The discipline and practice of qualitative research. In *Handbook of Qualitative Research*, ed. Norman K. Denzin and Yvonna S. Lincoln. 1-29. Thousand Oaks, CA: Sage Publications.

Department of City and Regional Planning Workshop - Cornell University. 2007. Genesee Land Trust Conservation Plan. Ithaca: Cornell University.

Dewey, J. 1922. *Human Nature and Conduct.* New York: Modern Library.

———. 1930. *The Quest for Certainty: A Study of the Relationship between Knowledge and Action*. London: Allen & Unwin.

Dillman, Don A. 1978. *Mail and Telephone Surveys: The Total Design Method*. New York: John Wiley and Sons.

Downs, Anthony. 2005. Smart growth: Why we discuss it more than we do it. *Journal of the American Planning Association* 71 (4): 367 - 378.

Drummond, William J., and Steven P. French. 2008. The future of GIS in planning: Converging technologies and diverging interests. *Journal of the American Planning Association* 74 (2): 161-174.

Dudgeon, David, Angela H. Arthington, Mark O. Gessner, Zen-Ichiro Kawabata, Duncan J. Knowler, Christian Leveque, Robert J. Naiman, Anne-Helene Prier-Richard, Doris Soto, Elanie L.J. Stiassny, and Caroline A. Sullivan. 2006. Freshwater biodiversity: Importance, threats, status and conservation challenges. *Biological Reviews* 81 (02): 163-182.

Elderd, Bret D. 2003. The impact of changing flow regimes on riparian vegetation and the riparian species *Mimulus guttatus*. *Ecological Applications* 13 (6): 1610-1625.

Environmental Law Institute. 2003. Conservation thresholds for land use planners. Washington, D.C.

Esbah, Hayriye, Edward Cook, and Joseph Ewan. 2009. Effects of increasing urbanization on the ecological integrity of open space preserves. *Environmental Management* 43 (5): 846-862.

Ewan, Joseph, Rebecca Fish Ewan, and James Burke. 2004. Building ecology into the planning continuum: case study of desert land preservation in Phoenix, Arizona (USA). *Landscape and Urban Planning* 68 (1): 53-75.

Fábos, J. G. 2004. Greenway planning in the United States: Its origins and recent case studies. *Landscape and Urban Planning* 68 (2-3): 321-342.

Fahrig, Lenore. 1997. Relative effects of habitat loss and fragmentation on population extinction. *The Journal of Wildlife Management* 61 (3): 603-610.

FCC. 2008. *Recording Telephone Conversations*. http://www.fcc.gov/cgb/consumerfacts/recordcalls.html [30 October 2009].

Forman, Richard T. T. 1995. *Land Mosaics: The ecology of landscapes and regions*. New York: Cambridge University Press.

———. 2008. The urban region: Natural systems in our place, our nourishment, our home range, our future. *Landscape Ecology* 23 (3): 251-253.

Friedmann, John. 1987. *Planning in the Public Domain: From Knowledge to Action*. Princeton, NJ: Princeton University Press.

Fry, Gary L. A. 2001. Multifunctional landscapes - Towards transdisciplinary research. *Landscape and Urban Planning* 57 (3-4): 159-168.

Gall, Meredith D., Joyce P. Gall, and Walter R. Borg. 2003. *Educational Research: An Introduction*. 7th ed. San Francisco, CA: Allyn and Bacon.

Gallent, Nick, and Dave Shaw. 2007. Spatial planning, area action plans and the rural-urban fringe. *Journal of Environmental Planning and Management* 50 (5): 617 - 638.

George, Benjamin, Sarah Nelson, and Lindsay Winkler. 2009. Zion Canyon corridor futures study. Logan: Utah State University.

Glaser, Barney, and Anselm Strauss. 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago: Aldine.

Gobster, Paul H., Joan Iverson Nassauer, and Daniel J. Nadenicek. 2010. Landscape Journal and scholarship in landscape architecture: The next 25 years. *Landscape Journal* 29 (1): 52-70.

Gordon, Ascelin, David Simondson, Matt White, Atte Moilanen, and Sarah Adine Bekessy. 2009. Integrating conservation planning and landuse planning in urban landscapes. *Landscape and Urban Planning* 91 (4): 183-194.

Green, Samuel B., and Neil J. Salkind. 2008. *Using SPSS for Windows and Macintosh: Analyzing and Understanding Data*. 5th ed. Upper Saddle River, NJ: Pearson Prentice Hall.

Groat, Linda, and David Wang. 2002. *Architectural Research Methods*. New York: John Wiley and Sons.

Groves, Craig. 2008. The conservation biologist's toolbox for planners: Advances, challenges, and opportunities. *Landscape Journal* 27 (1): 81-96.

Hagerman, Shannon, Hadi Dowlatabadi, Terre Satterfield, and Tim McDaniels. 2010. Expert views on biodiversity conservation in an era of climate change. *Global Environmental Change* 20 (1): 192-207.

Haight, Robert G., Stephanie A. Snyder, and Charles S. Revellet. 2005. Metropolitan open-space protection with uncertain site availability. *Conservation Biology* 19: 327-337.

Hansen, Andrew J., Richard L. Knight, John M. Marzluff, Scott Powell, Kathryn Brown, Patricia H. Gude, and Kingsford Jones. 2005. Effects of exurban development on

biodiversity: Patterns, mechanisms, and research needs. *Ecological Applications* 15 (6): 1893-1905.

Harper, Thomas L., and Stanley M. Stein. 2006. *Dialogical Planning in a Fragmented Society*. New Brunswick, NJ: Center for Urban Policy Research.

Hartmann, Donald P. 1977. Considerations in the choice of interobserver reliability estimates. *Journal of Applied Behavior Analysis* 10 (1): 103-116.

Healey, Patsy. 1996. The communicative turn in planning theory and its implications for spatial strategy formations. *Environment and Planning B: Planning and Design* 23 (2): 217-234.

Hellmund, Paul Cawood, and Daniel Somers Smith. 2006. *Designing Greenways*. Washington, D.C.: Island Press.

Hersperger, Anna M. 1994. Landscape ecology and its potential application to planning. *Journal of Planning Literature* 9 (1): 14-29.

Hess, George R., and Richard A. Fischer. 2001. Communicating clearly about conservation corridors. *Landscape and Urban Planning* 55 (3): 195-208.

Hoellen, Kris. 2009. Coming to terms with Green Infrastructure. *Coastal Services*, May/June 2009, 4-6.

Holton, Judith A. 2007. The coding process and its challenges. In *The SAGE Handbook of Grounded Theory*, ed. Antony Bryant and Kathy Charmaz, 264-289. Thousand Oaks, CA: Sage Publications.

Hoover, Anne P., and Margaret A. Shannon. 1995. Building greenway policies within a participatory democracy framework. *Landscape and Urban Planning* 33 (1-3): 433-459.

Hostetler, Mark, and David Drake. 2009. Conservation subdivisions: A wildlife perspective. *Landscape and Urban Planning* 90 (3-4): 95-101.

Hsieh, Hsiu-Fang, and Sarah E. Shannon. 2005. Three approaches to qualitative content analysis. *Qual Health Res* 15 (9): 1277-1288.

Hudson, Barclay M., Thomas D. Galloway, and Jerome L. Kaufman. 1979. Comparison of current planning theories: Counterparts and contradictions. *Journal of the American Planning Association* 45 (4): 387 - 398.

Innes, Judith E. 1995. Planning theory's emerging paradigm: Communicative action and interactive practice. *Journal of Planning Education and Research* 14 (3): 183-189.

Innes, Judith E., and David E. Booher. 2004. Reframing public participation: Strategies for the 21st century. *Planning Theory & Practice* 5 (4): 419-436.

Innes, Judith E., Judith E. Gruber, Michael C. Neuman, and Robert Thompson. 1994. Coordinating growth and environmental management through consensus building. In *CPS Report: A Policy Research Program Report*. Berkeley: University of California.

Jabareen, Yosef Rafeq. 2006. Sustainable urban forms: Their typologies, models, and concepts. *Journal of Planning Education and Research* 26 (1): 38-52.

James, Philip, Kosta Tzoulas, Mags D. Adams, Alan Barber, John Box, Juergen Breuste, Thomas Elmqvist, Mathew Frith, Chris Gordon, Katherine L. Greening, John Handley, Stephen Haworth, Aleksandra E. Kazmierczak, Mark Johnston, Kalevi Korpela, Marco Moretti, Jani Niemelä, Stephan Pauleit, Maggie H. Roe, Jon P. Sadler, and C. Ward Thompson. 2009. Towards an integrated understanding of green space in the European built environment. *Urban Forestry & Urban Greening* 8 (2): 65-75.

Jantz, Patrick, Scott Goetz, and Claire Jantz. 2005. Urbanization and the loss of resource lands in the Chesapeake Bay Watershed. *Environmental Management* 36 (6): 808-825.

Jepson, Edward J., Jr. 2004. Human nature and sustainable development: A strategic challenge for planners. *Journal of Planning Literature* 19 (1):3-15.

Johnson, John M. 2002. In-depth interviewing. In *Handbook of Interview Research: Context and Method*, ed. Jaber F. Gubrium and James A. Holstein, 103-119. Thousand Oaks, CA: Sage Publications.

Kaplan, Rachel. 2001. The nature of the view from home: Psychological benefits. *Environment and Behavior* 33 (4): 507-542.

Kartez, Jack D., and Molly P. Casto. 2008. Information into action: Biodiversity data outreach and municipal land conservation. *Journal of the American Planning Association* 74 (4): 467-480.

Kato, Sadahisa, and Jack Ahern. 2008. 'Learning by doing': Adaptive planning as a strategy to address uncertainty in planning. *Journal of Environmental Planning and Management* 51: 543-559.

Kaushal, Sujay S., Peter M. Groffman, Paul M. Mayer, Elise Striz, and Arthur J. Gold. 2008. Effects of stream restoration on denitrification in an urbanizing watershed. *Ecological Applications* 18 (3): 789-804.

Kim, Joongsub, and Rachel Kaplan. 2004. Physical and psychological factors in sense of community: New Urbanist Kentlands and nearby Orchard Village. *Environment and Behavior* 36 (3): 313-340.

Kirk, Jerome, and Marc L. Miller. 1986. *Reliability and Validity in Qualitative Research*. Edited by John Van Maanen, Peter K. Manning and Marc L. Miller. Vol. 1, *Qualitative Research Methods*. Beverly Hills, CA: Sage Publications.

Kline, Jeffrey D. 2006. Public demand for preserving local open space. *Society & Natural Resources* 19 (7): 645 - 659.

Koomen, Eric, Jasper Dekkers, and Terry van Dijk. 2008. Open-space preservation in the Netherlands: Planning, practice and prospects. *Land Use Policy* 25 (3): 361-377.

Kotchen, Matthew J., and Shawn M. Powers. 2006. Explaining the appearance and success of voter referenda for open-space conservation. *Journal of Environmental Economics and Management* 52 (1): 373-390.

Krenichyn, Kira. 2006. `The only place to go and be in the city': Women talk about exercise, being outdoors, and the meanings of a large urban park. *Health & Place* 12 (4): 631-643.

Kuo, Frances E. 2001. Coping with poverty: Impacts of environment and attention in the inner city. *Environment and Behavior* 33 (1):5-34.

Kuo, Frances E., and William C. Sullivan. 2001. Environment and crime in the inner city: Does vegetation reduce crime? *Environment and Behavior* 33 (3): 343-367.

Lachapelle, P. R., S. F. McCool, and M. E. Patterson. 2003. Barriers to effective natural resource planning in a "messy" world. *Society and Natural Resources* 16: 473-490.

Lancaster, R.A., ed. 1990. *Recreation, Park, and Open Space Standards and Guidelines*. Ashburn, VA: National Recreation and Park Association.

Laurian, Lucie, Maxine Day, Philip Berke, Neil Ericksen, Michael Backhurst, Jan Crawford, and Jenny Dixon. 2004. Evaluating plan implementation. *Journal of the American Planning Association* 70 (4): 471-480.

Lee, Chanam, and Anne Vernez Moudon. 2004. Physical activity and environment research in the health field: Implications for urban and transportation planning practice and research. *Journal of Planning Literature* 19 (2): 147-181.

Likert, Rensis. 1932. A technique for the measurement of attitudes. *Archives of Psychology* 140: 1-55.

Linehan, John, Meir Gross, and John Finn. 1995. Greenway planning: Developing a landscape ecological network approach. *Landscape and Urban Planning* 33 (1-3): 179-193.

Ling, Christopher, Kevin Hanna, and Ann Dale. 2009. A template for integrated community sustainability planning. *Environmental Management* 44 (2): 228-242.

Lord, Janice M., and David A. Norton. 1990. Scale and the spatial concept of fragmentation. *Conservation Biology* 4 (2): 197-202.

Luck, Matthew, and Jianguo Wu. 2002. A gradient analysis of urban landscape pattern: a case study from the Phoenix metropolitan region, Arizona, USA. *Landscape Ecology* 17 (4): 327-339.

Marsh, William M. 1998. *Landscape Planning: Environmental Applications*. 3rd ed. New York: John Wiley and Sons, Inc.

Maruani, Tseira, and Irit Amit-Cohen. 2007. Open space planning models: A review of approaches and methods. *Landscape and Urban Planning* 81 (1-2): 1-13.

Matsuoka, Rodney H., and Rachel Kaplan. 2008. People needs in the urban landscape: Analysis of Landscape and Urban Planning contributions. *Landscape and Urban Planning* 84 (1): 7-19.

Mayer, F. Stephan, Cynthia McPherson Frantz, Emma Bruehlman-Senecal, and Kyffin Dolliver. 2009. Why is nature beneficial? The role of connectedness to nature. *Environment and Behavior* 41 (5): 607-643.

McCracken, Grant. 1988. *The Long Interview*. Vol. 13, *Qualitative Research Methods Series*. Newbury Park, CA: Sage Publications.

McHarg, Ian. 1969. *Design with Nature*. Garden City, NJ: Natural History Press.

———. 1992. *Design with Nature*. 25th Anniversary ed. New York: John Wiley and Sons, Inc.

McMillan, Tracy E. 2005. Urban form and a child's trip to school: The current literature and a framework for future research. *Journal of Planning Literature* 19 (4): 440-456.

Merenlender, A. M., L. Huntsinger, G. Guthey, and S. K. Fairfax. 2004. Land trusts and conservation easements: Who is conserving what for whom? *Conservation Biology* 18: 65-76.

Milder, Jeffrey C. 2007. A framework for understanding conservation development and its ecological implications. *Bioscience* 57 (9): 757-768.

Miles, Matthew B., and A. Michael Huberman. 1994. *Qualitative Data Analysis*. 2nd ed. Thousand Oaks, California, CA: Sage Publications.

Miller, James R., Martha Groom, George R. Hess, Toddi Steelman, David L. Stokes, J.A.N. Thompson, Troy Bowman, Laura Fricke, Brandon King, and Ryan Marquardt. 2009. Biodiversity conservation in local planning. *Conservation Biology* 23 (1): 53-63.

Miller, James R., and Richard J. Hobbs. 2002. Conservation where people live and work. *Conservation Biology* 16 (2): 330-337.

Miller, James R., John Wiens, N. T. Hobbs, and D. M. Theobald. 2003. Effects of human settlement on bird communities in lowland riparian areas of Colorado (USA). *Ecological Applications* 13 (4): 1041-1059.

Miller, William, Michael G. Collins, Frederick R. Steiner, and Edward Cook. 1998. An approach for greenway suitability analysis. *Landscape and Urban Planning* 42 (2-4): 91-105.

Murphy, Michael T. 2001. Source-sink dynamics of a declining Eastern Kingbird population and the value of sink habitats. *Conservation Biology* 15: 737-748.

Naiman, Robert J. 1999. A perspective on interdisciplinary science. *Ecosystems* 2 (4): 292-295.

Nash, Roderick Frazier. 2001. *Wilderness and the American Mind*. 4th ed. New Haven, CT: Yale University.

Nassauer, Joan, and Paul Opdam. 2008. Design in science: Extending the landscape ecology paradigm. *Landscape Ecology* 23 (6): 633-644.

Naveh, Zev. 2001. Ten major premises for a holistic conception of multifunctional landscapes. *Landscape and Urban Planning* 57 (3-4): 269-284.

———. 2007. Landscape ecology and sustainability. *Landscape Ecology* 22 (10): 1437-1440.

Ndubisi, Forster. 2002. Managing change in the landscape: A synthesis of approaches for ecological planning. *Landscape Journal* 21 (1): 138-155.

Nelson, Arthur C. 2006. Leadership in a new era. *Journal of the American Planning Association* 72: 393-407.

Nelson, Erik, Michinori Uwasu, and Stephen Polasky. 2007. Voting on open space: What explains the appearance and support of municipal-level open space conservation referenda in the United States? *Ecological Economics* 62 (3-4): 580-593.

Noerager Stern, Phyllis. 2007. On solid ground: Essential properties for growing grounded theory. In *The SAGE Handbook Grounded Theory*, ed. Antony Bryant and Kathy Charmaz, 114-126. Thousand Oaks, CA: Sage Publications.

Odell, Eric A., and Richard L. Knight. 2001. Songbird and medium-sized mammal communities associated with exurban development in Pitkin County, Colorado. *Conservation Biology* 15: 1143-1150.

Organisation for Economic Co-operation and Development. 2003. OECD Environmental Indicators: Development, Measurement and Use. Paris, France: Organisation for Economic Co-operation and Development.

Pierce, Shirley M., Richard M. Cowling, Andrew T. Knight, Amanda T. Lombard, Mathieu Rouget, and Trevor Wolf. 2005. Systematic conservation planning products for land-use planning: Interpretation for implementation. *Biological Conservation* 125 (4): 441-458.

Polasky, Stephen, Erik Nelson, Eric Lonsdorf, Paul Fackler, and Anthony Starfield. 2005. Conserving species in a working landscape: Land use with biological and economic objectives. *Ecological Applications* 15 (4): 1387-1401.

Porreca, Lori. 2005. Social capital and implementation: A comparative analysis of trail planning projects. Masters Thesis, Landscape Architecture and Environmental Planning, Utah State University, Logan.

Pulliam, H. Ronald, and Bart R. Johnson. 2002. Ecology's new paradigm: What does it offer designers and planners? In *Ecology and Design: Frameworks for Learning*, ed. Bart R. Johnson and Kristina Hill, 51-84. Washington, D.C.: Island Press.

Quality Planning. 2009. *The Pressure-State-Response Framework*. New Zealand Ministry for the Environment. http://www.qualityplanning.org.nz/monitoring/intro-pressure-state-response-framework.php [16 September 2009].

Quayle, Moura. 1995. Urban greenways and public ways: Realizing public ideas in a fragmented world. *Landscape and Urban Planning* 33 (1-3): 461-475.

Randolph, John. 2003. *Environmental Land Use Planning and Management*. Washington, D.C.: Island Press.

Rapport, David. 1979. *Toward a comprehensive framework for environmental statistics: A stress-response approach*. Ottawa: Statistics Canada.

Reed, Mark S. 2008. Stakeholder participation for environmental management: A literature review. *Biological Conservation* 141 (10): 2417-2431.

Rees, William E. 1995. Achieving sustainability: Reform or transformation? *Journal of Planning Literature* 9 (4):343-361.

Regan, Helen M., Mark Colyvan, and Lisa Markovchick-Nicholls. 2006. A formal model for consensus and negotiation in environmental management. *Journal of Environmental Management* 80 (2): 167-176.

Riley, Seth P. D., Raymond M. Sauvajot, Todd K. Fuller, Eric C. York, Denise A. Kamradt, Cassity Bromley, and Robert K. Wayne. 2003. Effects of urbanization and habitat fragmentation on bobcats and coyotes in Southern California. *Conservation Biology* 17:v566-576.

Risser, Paul G. 1999. Landscape Ecology: Does the Science Only Need to Change at the Margin? In *Landscape Ecological Analysis: Issues and Applications*, ed. by Jeffrey M. Klopatek and Robert H. Gardner, 3-10. New York, NY: Springer-Verlag.

Rittel, Horst W. J., and Melvin M. Webber. 1973. Dilemmas in a general theory of planning. *Policy Sciences* 4 (2): 155-169.

Rodriguez, Daniel A., Asad J. Khattak, and Kelly R. Evenson. 2006. Can New Urbanism encourage physical activity? *Journal of the American Planning Association* 72: 43-54.

Romesburg, H. Charles. 1981. Wildlife science: Gaining reliable knowledge. *Journal of Wildlife Management* 45 (21): 293-313.

Rosenberg, Ann M. 1986. An emerging paradigm for landscape architecture. *Landscape Journal* 5 (2): 75-82.

Ryan, Robert L., Julius Gyula Fábos, and Jessica Jo Allan. 2006. Understanding opportunities and challenges for collaborative greenway planning in New England. *Landscape and Urban Planning* 76 (1-4): 172-191.

Sagalyn, Lynne B. 2007. Public/private development. *Journal of the American Planning Association* 73: 7-22.

Sandercock, Leonie, ed. 1998a. *Making the Invisible Visible: A Multicultural Planning History*. Berkeley: University of California Press.

———. 1998b. *Towards Cosmopolis*. West Sussex, England: John Wiley and Sons, Inc.

———. 2005. The democratization of planning: Elusive or illusory? *Planning Theory & Practice* 6 (4): 437 - 441.

Schmidt, Stephan J. 2008. The evolving relationship between open space preservation and local planning practice. *Journal of Planning History* 7 (2): 91-112.

Scopus. 2010. Elsevier B.V.

Scott, J. Michael, Frank Davis, Blair Csuti, Reed Noss, Bart Butterfield, Craig Groves, Hal Anderson, Steve Caicco, Frank D'Erchia, Thomas C. Edwards, Jr., Joe Ulliman, and R. Gerald Wright. 1993. GAP analysis: A geographic approach to protection of biological diversity. *Wildlife Monographs* (123): 3-41.

Senge, Peter M. 1990. *The Fifth Discipline: The Art and Practice of the Learning Organization*. New York: Currency Doubleday.

Shandas, Vivek, and W. Barry Messer. 2008. Fostering green communities through civic engagement: Community-based environmental stewardship in the Portland area. *Journal of the American Planning Association* 74 (4): 408-418.

Siegel, S. 1956. *Nonparametric Statistics for the Behavioral Sciences*. New York: McGraw-Hill Book Company.

SITES. 2008. *The Sustainable Sites Initiative*. http://www.sustainablesites.org/ [28 March 2010].

Solecki, William D., and Charles Oliveri. 2004. Downscaling climate change scenarios in an urban land use change model. *Journal of Environmental Management* 72 (1-2): 105-115.

Soule, Michael E. 1991. Land use planning and wildlife maintenance. *Journal of the American Planning Association* 57 (3): 313-323.

SPSS for Windows Release 15.0.1. Chicago: SPSS.

Steelman, Toddi, and George Hess. 2009. Effective protection of open space: Does planning matter? *Environmental Management* 44 (1): 93-104.

Stephenson, Janet. 2008. The cultural values model: An integrated approach to values in landscapes. *Landscape and Urban Planning* 84 (2): 127-139.

Stoms, David M. 2000. GAP management status and regional indicators of threats to biodiversity. *Landscape Ecology* 15 (1): 21-33.

Strauss, Anselm, and Juliet Corbin. 1990. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. Newbury Park, CA: Sage Publications.

Szabo, Peter S. 2009. Noah at the ballot box: Status and challenges. *Bioscience* 57 (5):424-427.

Talen, Emily, and Gerrit Knaap. 2003. Legalizing smart growth: An empirical study of land use regulation in Illinois. *Journal of Planning Education and Research* 22 (4): 345-359.

Tasan-Kok, Tuna. 2008. Changing interpretations of flexibility in the planning literature: From opportunism to creativity? *International Planning Studies* 13 (3): 183 - 195.

Tesch, R. 1990. *Qualitative Research: Analysis types and software tools*. New York, New York: Falmer.

Theobald, David M. 2001. Land-use dynamics beyond the American urban fringe. *Geographical Review* 91 (3): 544-564.

Thompson, Robert H. 2004. Overcoming barriers to ecologically sensitive land management: Conservation subdivisions, green developments, and the development of a land ethic. *Journal of Planning Education and Research* 24 (2): 141-153.

Tippett, Joanne, John F. Handley, and Joe Ravetz. 2007. Meeting the challenges of sustainable development - A conceptual appraisal of a new methodology for participatory ecological planning. *Progress in Planning* 67 (1): 9-98.

Troy, Austin, J. Grove, Jarlath O'Neil-Dunne, Steward Pickett, and Mary Cadenasso. 2007. Predicting opportunities for greening and patterns of vegetation on private urban lands. *Environmental Management* 40 (3): 394-412.

Tzolova, Genoveva V. 1995. An experiment in greenway analysis and assessment: The Danube River. *Landscape and Urban Planning* 33 (1-3): 283-294.

United Nations. 2009. *UN Department of Economic and Social Affairs Division for Sustainable Development*. http://www.un.org/esa/dsd/index.shtml [28 March 2010].

US EPA. 2010. *HUD-DOT-EPA Interagency Partnership for Sustainable Communities*, http://www.epa.gov/smartgrowth/partnership/index.html [28 March 2010].

Vaccaro, Ismael, and Karma Norman. 2008. Social sciences and landscape analysis: Opportunities for the improvement of conservation policy design. *Journal of Environmental Management* 88 (2): 360-371.

Vandegrift, Donald, and Tommer Yoked. 2004. Obesity rates, income, and suburban sprawl: An analysis of US states. *Health & Place* 10 (3): 221-229.

Waldner, Leora S. 2009. Into the black hole: Do local governments implement their spatial policies? *Land Use Policy* 26 (3): 818-827.

Weber, Robert Philip. 1985. *Basic Content Analysis*. Ed. Richard G. Niemi, Vol. 49, *Quantitative Applications in the Social Sciences*. Beverly Hills: Sage Publications.

Webler, Thomas, Seth Tuler, and Rob Krueger. 2001. What is a good public participation process? Five perspectives from the public. *Environmental Management* 27 (3): 435-450.

White, Rehema M., Anke Fischer, Keith Marshall, Justin M.J. Travis, Thomas J. Webb, Salvatore di Falco, Steve M. Redpath, and René van der Wal. 2009. Developing an integrated conceptual framework to understand biodiversity conflicts. *Land Use Policy* 26 (2): 242-253.

Wiens, John. 2007. The dangers of black-and-white conservation. *Conservation Biology* 21 (5): 1371-1372.

———. 2009. Landscape ecology as a foundation for sustainable conservation. *Landscape Ecology* 24 (8): 1053-1065.

Wilcove, David S., David Rothstein, Jason Dubow, Ali Phillips, and Elizabeth Losos. 1998. Quantifying threats to imperiled species in the United States. *Bioscience* 48 (8): 607-615.

Wu, JunJie. 2006. Environmental amenities, urban sprawl, and community characteristics. *Journal of Environmental Economics and Management* 52 (2): 527-547.

Yahner, Thomas G., Neil Korostoff, Timothy P. Johnson, A. Mark Battaglia, and Daniel R. Jones. 1995. Cultural landscapes and landscape ecology in contemporary greenway planning, design and management: A case study. *Landscape and Urban Planning* 33 (1-3): 295-316.

Yen, Hope. 2010. Minority births on track to outnumber white births. *Yahoo! News*, http://news.yahoo.com/s/ap/us_white_minority [10 April 2010].

Zipperer, Wayne C., Jianguo Wu, Richard V. Pouyat, and Steward T. A. Pickett. 2000. The application of ecological principles to urban and urbanizing landscapes *Ecological Applications* 10 (3): 685-688.

# APPENDICES

APPENDIX I

LITERATURE REVIEW – ARTICLES SELECTED

| Author | Average citation | Cited By | Year | Article Title |
|---|---|---|---|---|
| ***Journal: Conservation Biology*** | | | | |
| Odell and Knight | 6.2 | 56 | 2001 | Songbird and Medium-Sized Mammal Communities Associated with Exurban Development in Pitkin County, Colorado |
| Murphy | 3.1 | 25 | 2002 | Source-Sink Dynamics of a Declining Eastern Kingbird Population and the Value of Sink Habitats |
| Riley et al. | 7.0 | 49 | 2003 | Effects of Urbanization and Habitat Fragmentation on Bobcats and Coyotes in Southern California |
| Merenlender et al. | 5.5 | 33 | 2004 | Land Trusts and Conservation Easements: Who Is Conserving What for Whom? |
| Haight, Snyder and Revellet | 3.6 | 18 | 2005 | Metropolitan Open-Space Protection with Uncertain Site Availability |
| ***Journal: Ecological Applications*** | | | | |
| Hansen et al. | 18.40 | 92 | 2005 | Effects of exurban development on biodiversity: Patterns, mechanisms, and research needs |
| Brown et al. | 16.00 | 80 | 2005 | Rural land-use trends in the conterminous United States, 1950-2000 |
| Polasky et al. | 10.75 | 43 | 2005 | Conserving species in a working landscape: Land use with biological and economic objectives |
| Miller et al. | 4.00 | 28 | 2003 | Effects of human settlement on bird communities in lowland riparian areas of Colorado (USA) |
| Zipperer et al. | 5.10 | 51 | 2000 | The application of ecological principles to urban and urbanizing landscapes |
| ***Journal: Environment and Behavior*** | | | | |
| Kaplan | 11.89 | 107 | 2001 | The Nature of the View from Home: Psychological Benefits |
| Kuo and Sullivan | 9.11 | 82 | 2001 | Environment and crime in the inner city does vegetation reduce crime? |
| Kuo | 6.11 | 55 | 2001 | Coping with Poverty: Impacts of Environment and Attention in the Inner City |

| | | | | |
|---|---|---|---|---|
| Kim and Kaplan | 4.83 | 29 | 2004 | Physical and psychological factors in sense of community: New urbanist Kentlands and nearby orchard village |
| Mayer et al. | 5.00 | 5 | 2009 | Why Is Nature Beneficial?: The Role of Connectedness to Nature |
| ***Journal: Environmental Management*** | | | | |
| Jantz, Goetz, and Jantz | 5.40 | 27 | 2005 | Urbanization and the Loss of Resource Lands in the Chesapeake Bay Watershed |
| Troy et al. | 3.33 | 10 | 2007 | Predicting Opportunities for Greening and Patterns of Vegetation on Private Urban Lands |
| Carter and Fowler | 2.00 | 4 | 2008 | Establishing green roof infrastructure through environmental policy instruments |
| Esbah, Cook, and Ewan | 1.00 | 1 | 2009 | Effects of Increasing Urbanization on the Ecological Integrity of Open Space Preserves |
| Conway and Lathrop | 1.40 | 7 | 2005 | Modeling the Ecological Consequences of Land-Use Policies in an Urbanizing Region |
| ***Journal: Health and Place*** | | | | |
| Vandegrift and Yoked | 5.3 | 32 | 2004 | Obesity rates, income, and suburban sprawl: an analysis of US states |
| Cohen, Inagami, and Finch | 4.5 | 9 | 2008 | The built environment and collective efficacy |
| Krenichyn | 2.00 | 8 | 2006 | 'The only place to go and be in the city': women talk about exercise, being outdoors, and the meanings of a large urban park |
| Cutchin | 2.00 | 6 | 2007 | The need for the "new health geography" in epidemiologic studies of environment and health |
| Armstrong | 3.0 | 30 | 2000 | A survey of community gardens in upstate New York: Implications for health promotion and community development |
| ***Journal: Journal of Environmental Management*** | | | | |
| Bolitzer and Netusil | 5.4 | 54 | 2000 | The impact of open spaces on property values in Portland, Oregon |
| Bhat | 3.6 | 25 | 2003 | Application of non-market valuation to the Florida Keys marine reserve management |
| Bowman, Thompson, and Colletti | 2.00 | 2 | 2009 | Valuation of open space and conservation features in residential subdivisions |

| | | | | |
|---|---|---|---|---|
| Regan, Colyvan, and Markovchick-Nicholls | 3.5 | 14 | 2006 | A formal model for consensus and negotiation in environmental management |
| Solecki and Oliveri | 4.67 | 28 | 2004 | Downscaling climate change scenarios in an urban land use change model |
| ***Journal: Journal of Planning Education and Research*** | | | | |
| Jabereen | 3.75 | 15 | 2006 | Sustainable Urban Forms: Their Typologies, Models, and Concepts |
| Talen and Knapp | 3.00 | 21 | 2003 | Legalizing Smart Growth: An Empirical Study of Land Use Regulation in Illinois |
| Jepson | 2.17 | 13 | 2004 | The Adoption of Sustainable Development Policies and Techniques in U.S. Cities: How Wide, How Deep, and What Role for Planners? |
| Thompson | 2.17 | 13 | 2004 | Overcoming Barriers to Ecologically Sensitive Land Management: Conservation Subdivisions, Green Developments, and the Development of a Land Ethic |
| Brody, Carrasco, and Highfield | 2.00 | 8 | 2006 | Measuring the Adoption of Local Sprawl: Reduction Planning Policies in Florida |
| ***Journal: Journal of Planning Literature*** | | | | |
| Berke | 7.25 | 58 | 2002 | Does Sustainable Development Offer a New Direction for Planning? Challenges for the Twenty-First Century |
| McMillan | 7.20 | 36 | 2005 | Urban Form and a Child's Trip to School: The Current Literature and a Framework for Future Research |
| Brabec, Schulte and Richards | 6.50 | 52 | 2002 | Impervious Surfaces and Water Quality: A Review of Current Literature and Its Implications for Watershed Planning |
| Lee and Moudon | 6.50 | 39 | 2004 | Physical activity and environment research in the health field: Implications for urban and transportation planning practice and research |
| ***Journal: Journal of the American Planning Association*** | | | | |
| Daniels and Lapping | 3.60 | 18 | 2005 | Land Preservation: An Essential Ingredient in Smart Growth |

| | | | | |
|---|---|---|---|---|
| Rodriguez, Khattak, and Evenson | 7.75 | 31 | 2006 | Can New Urbanism Encourage Physical Activity |
| Downs | 5.40 | 27 | 2005 | Smart growth: Why we discuss it more than we do it |
| Day | 4.50 | 18 | 2006 | Active living and social justice: Planning for physical activity in low-income, Black, and Latino communities |
| Sagalyn | 4.33 | 13 | 2007 | Public/Private Development |
| Nelson | 4.00 | 16 | 2006 | Leadership in a New Era |
| ***Journal: Landscape and Urban Planning*** | | | | |
| Chace and Walsh | 17.00 | 68 | 2006 | Urban effects on native avifauna: a review |
| Botequilha Leitão and Ahern | 16.13 | 129 | 2002 | Applying landscape ecological concepts and metrics in sustainable landscape planning |
| Bengston, Fletcher, and Nelson | 7.00 | 49 | 2003 | Public policies for managing urban growth and protecting open space: policy instruments and lessons learned in the United States |
| Bryant | 4.00 | 16 | 2006 | Urban landscape conservation and the role of ecological greenways at local and metropolitan scales |
| Corry and Nassauer | 6.00 | 30 | 2005 | Limitations of using landscape pattern indices to evaluate the ecological consequences of alternative plans and designs |
| ***Journal: Landscape Ecology*** | | | | |
| Luck and Wu | 16.88 | 135 | 2002 | A gradient analysis of urban landscape pattern: a case study from the Phoenix metropolitan region, Arizona, USA |
| Nassauer and Opdam | 6.50 | 13 | 2008 | Design in science: Extending the landscape ecology paradigm |
| Stoms | 3.30 | 33 | 2000 | GAP management status and regional indicators of threats to biodiversity |
| Forman | 3.00 | 6 | 2008 | The urban region: natural systems in our place, our nourishment, our home range, our future |
| Blair and Johnson | 3.00 | 6 | 2008 | Suburban habitats and their role for birds in the urban–rural habitat network: points of local invasion and extinction? |

APPENDIX II

GROUNDED THEORY CATEGORIES

| | Core Categories | Categories and Subcategories | Topics |
|---|---|---|---|
| | **PRESSURES** | | |
| A | | **Built Environment** | |
| 1 | Subcategories | Humans and Landscape | Species Effects |
| 2 | | Humans and Society | Development Patterns, Health Effects |
| A | | **Disconnect** | |
| 3 | Subcategories | Cultural Models and Individual Behaviors | Behavior and open space values, cultural models and open space values |
| 4 | | Planning and Policies | Reactive Nature of Planning, Policies and Open Space Values |
| B | | **Shifting Perspectives** | |
| 5 | Subcategories | Paradigm Shifts | Timing |
| 6 | | Changing landscapes - human and ecological | |
| | **OPEN SPACE PARADIGM** | | |
| C | | **Engage** | |
| 7 | Subcategories | Allows for community open space vision to be developed | |
| 8 | | Communication issues/level of engagement | Messaging and Marketing |
| 9 | | Engage diverse stakeholders | |
| 10 | | Inclusive/collaborative nature of process | Social equity |
| 11 | | Informed citizens/stewardship | Sense of place |
| 12 | | Leadership | Steering Committee, Project Champion |
| 13 | | Open Space Planning is Proactive | |
| 14 | | Political Nature of Process | Power, Willing Communities |
| 15 | | Public Engagement | |

| | | | |
|---|---|---|---|
| 16 | | Relationships | Relationships with community; Role of model developer/ organization; partners and mentors; Social and Research Connections, Trust |
| C | | **Illustrate** | |
| 17 | Subcategories | Analysis Process | Data Management and Quality, Prioritizing Process |
| 18 | | Analysis Tools | GIS |
| 19 | | Context & Scale | Regionalism, Local level, Scalability |
| 20 | | Education | |
| 21 | | Framework | Comprehensive Framework, Simplified Framework, Captures/ maps/can value untraditional planning elements |
| 22 | | Funding | |
| 23 | | Implementation Process | Prioritizing Process |
| 24 | | Implementation Tools | |
| 25 | | Increases connectivity with landscape | |
| 26 | | Open Space as Assets | Open space typology/multiple names; value of utility corridors/development open space type |
| 27 | | Quality of life/richness | Health and Restorative landscapes, Social networks and social capital; Social equity; Built environment |
| 28 | | Role of economics | Socioeconomic factors |
| 29 | | Role of Science | Role of Landscape Ecology |

| | | | |
|---|---|---|---|
| 30 | | Transparent Nature | |
| C | | **Commit** | |
| 31 | Subcategories | Adaptability | Evolution of Model, Risk-taking, Innovation |
| 32 | | Keep efforts focused - set goals first | |
| 33 | | Perseverance | |
| 34 | | Planner's Role | Cannot replicate personal experience, question-asking process, education, etc. |
| 35 | | Priority and Decision Making Process | Consensus, Ecology as Priority Setters, Role of Public and Stakeholders, Social Processes, Tools for Prioritizing |
| 36 | | Systems Thinking | |

# APPENDIX III

## LETTER OF INFORMATION



Utah State University IRB Approved: 11/11/2009
Approval terminates: 11/10/2010
Protocol No: 2478
IRB Password Protected per IRB Administrator

UtahState University

Department of Landscape Architecture and Environmental Planning
4005 Old Main Hill
Logan UT 84322-4005
Telephone: (435) 797-0501

**LETTER OF INFORMATION**

Towards Landscape Integrity
The Integration of Ecological and Social Frameworks in Open Space Planning

**Voluntary nature of participation and right to withdraw without consequence** Participation in research is entirely voluntary. You may refuse to participate or withdraw at any time without consequence or loss of benefits. You may withdraw your participation upon review of the interview transcripts. You may be withdrawn from this study without your consent by the investigator if you are unwilling/unable to complete any of the requested procedures.

**Confidentiality** Research records will be kept confidential, consistent with federal and state regulations, as requested or needed by research participants. Only the investigator and co-investigator will have access to the data which will be kept in a locked file cabinet in a locked room. Personal, identifiable information will be kept for the duration of the research project (November 2009 - March 2010), at which time all contact information linking audio recordings to participants will be destroyed.

**IRB Approval Statement** The Institutional Review Board for the protection of human participants at USU has approved this research study. If you have any pertinent questions or concerns about your rights or a research-related injury, you may contact the IRB Administrator at (435) 797-0567 or email irb@usu.edu. If you have a concern or complaint about the research and you would like to contact someone other than the research team, you may contact the IRB Administrator to obtain information or to offer input.

**Copy of consent** You have been given two copies of this Informed Consent. Please sign both copies and retain one copy for your files.

**Investigator Statement** "I certify that the research study has been explained to the individual, by me or my research staff, and that the individual understands the nature and purpose, the possible risks and benefits associated with taking part in this research study. Any questions that have been raised have been answered."

Utah State University IRB Approved: 11/11/2009
Approval terminates: 11/10/2010
Protocol No: 2478
IRB Password Protected per IRB Administrator

Department of Landscape Architecture and Environmental Planning
4005 Old Main Hill
Logan UT 84322-4005
Telephone: (435) 797-0501

**LETTER OF INFORMATION**

Towards Landscape Integrity
The Integration of Ecological and Social Frameworks in Open Space Planning

**Signature of PI & student or Co-PI**

Dr. Carlos Licon
*Principal Investigator*
*1-435-797-0500; carlos_licon@usu.edu*

Lindsay Ex
*Graduate Student Research Assistant*
*1-435-757-6351; lindsayawinkler@gmail.com*

**Signature of Participant** By signing below, I agree to participate.

Participant's signature _____ Date _____

# APPENDIX IV

## INTERVIEW QUESTIONS

1. I'd like to begin by asking you a few questions about how you go about your work and your philosophy about what you do and why you do it. First, can you tell me about the model you are working with and what motivates you to work with this model?

    Probe: Who else does what you do the way you do it?

2. Going deeper into how your model functions, can you tell me about what works well in your model? Or, what are the strengths of this model?

    Probe: Are there any particular practices that you draw upon?
    Probe: Are there relationships that are critical to your success?
    Probe: What tools do you use within your model (e.g., maps, etc.)?

3. Continuing with how your model functions, can you tell me what does not work well within your model?

Probe: Are there any particular problems you run into?

4. Now, I'd like to focus more where you work and who you work with, can you describe the types of communities or areas in which you work?

5. Focusing more on the people and relationships that are associated with your model, can you describe who you work with in these areas?

Probe: How do you work with them?
    Probe: Who do you work with that is most central to your success?
    Probe: Is there anyone you don't work with?

6. How do you prioritize areas of open space in your model? Can you talk about specific projects to describe this process?

Probe: Can you describe how you incorporate multiple perspectives (or ways of thinking) into your model, e.g., the scientific community and those with more experienced-based knowledge?

Probe: Are there tradeoffs you have to make when trying to integrate these perspectives, specifically the social and ecological communities?

7. Has your view of your model changed since you first began practicing it? If yes, how?

Probe: Are there specific best practices with which every practitioner of more integrated forms of open space planning should be aware?
Probe: Anything that these practitioners should avoid?
Probe: Can you talk about your most important lessons learned?

8. Do you have additional ideas you want to share before we conclude this interview?

**Demographic Questions:**

9. Can you state your professional title?

10. Can you state your years in practice?

11. Can you state your years of practicing your particular model?

12. Can you describe your educational history, including degree(s) and majors?

# APPENDIX VI

## MANN-WHITNEY *U* TEST RESULTS

| Subcategory | Group | N | Min | Max | Avg. Median | Std. Dev. | Results | U | Z | Sig. 2-tailed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Allows for community open space vision to be developed** | CEDAR | 3 | 3.0 | 5.0 | 3.8 | 1.041 | Interviews vs. Literature | 2.500 | -0.257 | 0.797 |
| | GI | 3 | 3.0 | 4.0 | 3.7 | 0.577 | GI vs. CEDAR | 4.500 | 0.000 | 1.000 |
| | Literature | 1 | 3.5 | 3.5 | 3.5 | N/A | GI Vs. Literature | 1.000 | -0.471 | 0.637 |
| | **Overall** | **7** | **3.0** | **5.0** | **3.7** | **0.699** | CEDAR vs. Literature | 1.500 | 0.000 | 1.000 |
| **Communication Issues/Levels of communication** | CEDAR | 4 | 2.0 | 4.0 | 2.9 | 0.854 | Interviews vs. Literature | 36.500 | -0.225 | 0.822 |
| | GI | 9 | 1.0 | 5.0 | 3.6 | 1.167 | GI vs. CEDAR | 9.000 | -1.437 | 0.151 |
| | Literature | 6 | 2.0 | 4.5 | 3.3 | 0.876 | GI Vs. Literature | 20.500 | -0.788 | 0.431 |
| | **Overall** | **19** | **1.0** | **5.0** | **3.4** | **1.012** | CEDAR vs. Literature | 8.000 | -0.869 | 0.385 |
| **Engage diverse stakeholders** | CEDAR | 4 | 3.5 | 5.0 | 4.3 | 0.646 | Interviews vs. Literature | 26.000 | -0.175 | 0.861 |
| | GI | 7 | 2.0 | 5.0 | 3.8 | 0.906 | GI vs. CEDAR | 10.000 | -0.797 | 0.426 |
| | Literature | 1 | 3.0 | 5.0 | 3.5 | 0.894 | GI Vs. Literature | 16.500 | -0.169 | 0.866 |
| | **Overall** | **16** | **2.0** | **5.0** | **3.9** | **0.814** | CEDAR vs. Literature | 7.500 | -0.623 | 0.533 |
| **Inclusive/ collaborative nature of process** | CEDAR | 4 | 3.0 | 3.0 | 3.0 | 0.000 | Interviews vs. Literature | 17.500 | -0.395 | 0.693 |
| | GI | 6 | 3.0 | 4.0 | 3.8 | 0.408 | GI vs. CEDAR | 2.000 | -2.449 | ***0.014*** |
| | Literature | 4 | 3.0 | 4.0 | 3.6 | 0.479 | GI Vs. Literature | 8.500 | -0.922 | 0.356 |
| | **Overall** | **14** | **3.0** | **4.0** | **3.5** | **0.499** | CEDAR vs. Literature | 2.000 | -2.000 | ***0.046*** |

| Subcategory | Group | N | Min | Max | Avg. Median | Std. Dev. | Results | U | Z | Sig. 2-tailed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Informed Citizens/ Stewardship** | CEDAR | 2 | 3.5 | 4.0 | 3.8 | 0.354 | Interviews vs. Literature | 18.000 | 0.000 | 1.000 |
| | GI | 4 | 3.0 | 4.5 | 3.6 | 0.750 | GI vs. CEDAR | 3.500 | -0.238 | 0.812 |
| | Literature | 6 | 3.0 | 4.0 | 3.7 | 0.516 | GI Vs. Literature | 12.000 | 0.000 | 1.000 |
| | **Overall** | **12** | **3.0** | **4.5** | **3.7** | **0.537** | CEDAR vs. Literature | 6.000 | 0.000 | 1.000 |
| **Leadership** | CEDAR | 5 | 3.0 | 4.0 | 3.5 | 0.707 | Interviews vs. Literature | 15.500 | -1.248 | 0.212 |
| | GI | 8 | 3.0 | 4.0 | 3.4 | 0.518 | GI vs. CEDAR | 10.000 | -1.566 | 0.117 |
| | Literature | 4 | 3.5 | 4.5 | 4.0 | 0.408 | GI Vs. Literature | 6.000 | -1.831 | 0.067 |
| | **Overall** | **17** | **3.0** | **4.5** | **3.7** | **0.585** | CEDAR vs. Literature | 9.500 | -0.127 | 0.899 |
| **Open Space Planning is Proactive** | CEDAR | 2 | 3.0 | 4.0 | 3.5 | 0.707 | Interviews vs. Literature | 8.000 | -0.610 | 0.542 |
| | GI | 1 | 4.5 | 4.5 | 4.5 | N/A | GI vs. CEDAR | 0.000 | -1.225 | 0.221 |
| | Literature | 7 | 3.5 | 5.0 | 4.2 | 0.567 | GI Vs. Literature | 2.000 | -0.702 | 0.483 |
| | **Overall** | **10** | **3.0** | **5.0** | **4.1** | **0.615** | CEDAR vs. Literature | 3.000 | -1.289 | 0.197 |
| **Political Nature of Process** | CEDAR | 4 | 3.0 | 4.0 | 3.3 | 0.500 | Interviews vs. Literature | 76.000 | -0.115 | 0.908 |
| | GI | 9 | 1.5 | 4.5 | 3.7 | 0.901 | GI vs. CEDAR | 9.500 | -1.450 | 0.147 |
| | Literature | 12 | 2.0 | 5.0 | 3.6 | 0.932 | GI Vs. Literature | 50.000 | -0.300 | 0.764 |
| | **Overall** | **25** | **1.5** | **5.0** | **3.6** | **0.850** | CEDAR vs. Literature | 18.000 | -0.784 | 0.433 |

| Subcategory | Group | N | Min | Max | Avg. Median | Std. Dev. | Results | U | Z | Sig. 2-tailed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Public Engagement** | CEDAR | 5 | 2.5 | 4.0 | 3.5 | 0.707 | Interviews vs. Literature | 35.500 | -1.042 | 0.297 |
| | GI | 9 | 3.0 | 5.0 | 3.9 | 0.882 | GI vs. CEDAR | 16.500 | -0.832 | 0.406 |
| | Literature | 7 | 1.5 | 5.0 | 3.2 | 1.220 | GI Vs. Literature | 20.500 | -1.200 | 0.315 |
| | **Overall** | **21** | **1.5** | **5.0** | **3.6** | **0.983** | CEDAR vs. Literature | 15.000 | -0.424 | 0.671 |
| **Relationships** | CEDAR | 5 | 3.0 | 4.0 | 3.8 | 0.447 | Interviews vs. Literature | 44.000 | -1.662 | 0.096 |
| | GI | 9 | 2.0 | 5.0 | 3.4 | 0.846 | GI vs. CEDAR | 14.500 | -1.125 | 0.261 |
| | Literature | 10 | 3.0 | 4.0 | 3.2 | 0.422 | GI Vs. Literature | 34.000 | -1.006 | 0.315 |
| | **Overall** | **24** | **2.0** | **5.0** | **3.4** | **0.637** | CEDAR vs. Literature | 10.000 | -2.160 | ***0.031*** |
| **Analysis Process*** | CEDAR | 5 | 3.0 | 3.0 | 3.0 | 0.000 | Interviews vs. Literature | 89.500 | -2.110 | ***0.035*** |
| | GI | 6 | 3.0 | 4.0 | 3.7 | 0.516 | GI vs. CEDAR | 5.000 | -2.182 | ***0.029*** |
| | Literature | 28 | 1.0 | 5.0 | 2.8 | 1.101 | GI Vs. Literature | 37.000 | -2.196 | ***0.028*** |
| | **Overall** | **39** | **1.0** | **5.0** | **2.9** | **1.004** | CEDAR vs. Literature | 52.500 | -0.929 | 0.353 |
| **Analysis Tools*** | CEDAR | 4 | 2.5 | 4.0 | 3.1 | 0.629 | Interviews vs. Literature | 150.000 | -2.599 | ***0.009*** |
| | GI | 9 | 3.0 | 4.0 | 3.5 | 0.500 | GI vs. CEDAR | 11.000 | -1.172 | 0.241 |
| | Literature | 37 | 1.5 | 4.0 | 3.0 | 0.372 | GI Vs. Literature | 78.000 | -3.280 | ***0.001*** |
| | **Overall** | **50** | **1.5** | **4.0** | **3.1** | **0.456** | CEDAR vs. Literature | 72.000 | -0.127 | 0.899 |

| Subcategory | Group | N | Min | Max | Avg. Median | Std. Dev. | Results | U | Z | Sig. 2-tailed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Context and Scale** | CEDAR | 4 | 3.0 | 4.0 | 3.8 | 0.500 | Interviews vs. Literature | 103.000 | -1.603 | 0.109 |
| | GI | 9 | 3.0 | 4.0 | 3.3 | 0.441 | GI vs. CEDAR | 9.000 | -1.561 | 0.118 |
| | Literature | 23 | 2.0 | 5.0 | 3.9 | 0.917 | GI Vs. Literature | 61.000 | -1.865 | 0.062 |
| | **Overall** | **36** | **2.0** | **5.0** | **3.7** | **0.815** | CEDAR vs. Literature | 42.000 | -0.375 | 0.707 |
| **Education** | CEDAR | 4 | 1.0 | 4.0 | 2.9 | 1.315 | Interviews vs. Literature | 24.500 | -0.064 | 0.949 |
| | GI | 6 | 3.0 | 4.0 | 3.4 | 0.492 | GI vs. CEDAR | 10.000 | -0.447 | 0.655 |
| | Literature | 5 | 2.0 | 5.0 | 3.4 | 1.140 | GI Vs. Literature | 14.000 | -0.193 | 0.847 |
| | **Overall** | **15** | **1.0** | **5.0** | **3.3** | **0.942** | CEDAR vs. Literature | 8.500 | -0.375 | 0.707 |
| **Framework*** | CEDAR | 5 | 1.0 | 4.5 | 3.3 | 1.396 | Interviews vs. Literature | 45.000 | -2.049 | ***0.040*** |
| | GI | 6 | 3.0 | 4.0 | 3.4 | 0.492 | GI vs. CEDAR | 12.500 | -0.479 | 0.632 |
| | Literature | 14 | 2.0 | 4.0 | 3.0 | 0.392 | GI Vs. Literature | 23.000 | -2.065 | ***0.039*** |
| | **Overall** | **25** | **1.0** | **4.5** | **3.2** | **0.703** | CEDAR vs. Literature | 22.000 | -1.463 | 0.144 |
| **Funding** | CEDAR | 1 | 4.5 | 4.5 | 4.5 | N/A | Interviews vs. Literature | 51.000 | -0.516 | 0.606 |
| | GI | 8 | 2.5 | 4.0 | 3.4 | 0.563 | GI vs. CEDAR | 0.000 | -0.152 | 0.127 |
| | Literature | 13 | 1.0 | 5.0 | 3.3 | 1.011 | GI Vs. Literature | 50.000 | -0.150 | 0.881 |
| | **Overall** | **22** | **1.0** | **5.0** | **3.4** | **0.868** | CEDAR vs. Literature | 1.000 | -1.397 | 0.162 |

| Subcategory | Group | N | Min | Max | Avg. Median | Std. Dev. | Results | U | Z | Sig. 2-tailed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Implementation Process** | CEDAR | 5 | 1.0 | 3.0 | 2.4 | 0.894 | Interviews vs. Literature | 51.500 | -0.861 | 0.389 |
| | GI | 8 | 1.0 | 4.0 | 3.1 | 0.991 | GI vs. CEDAR | 7.000 | -1.616 | 0.106 |
| | Literature | 10 | 1.0 | 5.0 | 3.4 | 1.528 | GI Vs. Literature | 35.000 | -0.453 | 0.650 |
| | **Overall** | **23** | **1.0** | **5.0** | **3.1** | **1.246** | CEDAR vs. Literature | 16.500 | -1.065 | 0.287 |
| **Implementation Tools** | CEDAR | 4 | 1.5 | 3.5 | 2.8 | 0.866 | Interviews vs. Literature | 183.500 | -0.072 | 0.943 |
| | GI | 8 | 2.0 | 4.0 | 3.5 | 0.756 | GI vs. CEDAR | 7.000 | -1.616 | 0.106 |
| | Literature | 31 | 2.0 | 5.0 | 3.3 | 0.746 | GI Vs. Literature | 100.500 | -0.865 | 0.387 |
| | **Overall** | **43** | **1.5** | **5.0** | **3.3** | **0.764** | CEDAR vs. Literature | 41.000 | -1.162 | 0.245 |
| **Increases connectivity with landscape** | CEDAR | 2 | 3.0 | 4.0 | 3.5 | 0.707 | Interviews vs. Literature | 6.000 | -0.683 | 0.495 |
| | GI | 2 | 4.0 | 4.0 | 4.0 | 0.000 | GI vs. CEDAR | 1.000 | -1.000 | 0.317 |
| | Literature | 4 | 3.0 | 4.0 | 3.5 | 0.577 | GI Vs. Literature | 2.000 | -1.118 | 0.264 |
| | **Overall** | **8** | **3.0** | **4.0** | **3.6** | **0.518** | CEDAR vs. Literature | 4.000 | 0.000 | 1.000 |
| **Open Space as Assets** | CEDAR | 4 | 3.0 | 4.0 | 3.6 | 0.479 | Interviews vs. Literature | 70.000 | -0.683 | 0.495 |
| | GI | 7 | 2.5 | 4.0 | 3.3 | 0.567 | GI vs. CEDAR | 9.000 | -0.994 | 0.320 |
| | Literature | 14 | 1.0 | 4.0 | 3.4 | 0.813 | GI Vs. Literature | 38.500 | -0.825 | 0.410 |
| | **Overall** | **25** | **1.0** | **4.0** | **3.4** | **0.692** | CEDAR vs. Literature | 24.500 | -0.396 | 0.692 |

| Subcategory | Group | N | Min | Max | Avg. Median | Std. Dev. | Results | U | Z | Sig. 2-tailed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Quality of Life** | CEDAR | 2 | 5.0 | 5.0 | 5.0 | 0.000 | Interviews vs. Literature | 30.000 | -1.917 | 0.055 |
| | GI | 3 | 3.5 | 4.0 | 3.8 | 0.289 | GI vs. CEDAR | 0.000 | -1.826 | 0.068 |
| | Literature | 25 | 1.0 | 5.0 | 3.4 | 0.894 | GI Vs. Literature | 29.000 | -0.678 | 0.410 |
| | **Overall** | **30** | **1.0** | **5.0** | **3.6** | **0.911** | CEDAR vs. Literature | 1.000 | -2.337 | ***0.019*** |
| **Role of Economics** | CEDAR | 2 | 2.0 | 2.0 | 2.0 | 0.000 | Interviews vs. Literature | 58.500 | -0.658 | 0.511 |
| | GI | 5 | 3.0 | 4.5 | 3.5 | 0.707 | GI vs. CEDAR | 0.000 | -2.029 | ***0.042*** |
| | Literature | 20 | 1.5 | 4.0 | 3.3 | 0.750 | GI Vs. Literature | 44.500 | -0.390 | 0.697 |
| | **Overall** | **27** | **1.5** | **4.5** | **3.2** | **0.789** | CEDAR vs. Literature | 3.000 | -2.007 | ***0.045*** |
| **Role of Science** | CEDAR | 4 | 3.5 | 4.5 | 4.0 | 0.707 | Interviews vs. Literature | 106.000 | -0.169 | 0.866 |
| | GI | 7 | 3.0 | 4.0 | 3.5 | 0.500 | GI vs. CEDAR | 7.000 | -1.364 | 0.173 |
| | Literature | 20 | 2.0 | 5.0 | 3.6 | 1.083 | GI Vs. Literature | 66.000 | -0.228 | 0.819 |
| | **Overall** | **31** | **2.0** | **5.0** | **3.6** | **0.922** | CEDAR vs. Literature | 32.000 | -0.630 | 0.529 |
| **Transparent Nature** | CEDAR | 2 | 3.5 | 4.5 | 4.0 | 0.707 | Interviews vs. Literature | 5.500 | -0.173 | 0.863 |
| | GI | 4 | 4.0 | 5.0 | 4.6 | 0.479 | GI vs. CEDAR | 1.500 | -1.192 | 0.233 |
| | Literature | 2 | 4.0 | 5.0 | 4.5 | 0.707 | GI Vs. Literature | 3.500 | -0.250 | 0.803 |
| | **Overall** | **8** | **3.5** | **5.0** | **4.4** | **0.563** | CEDAR vs. Literature | 1.000 | -0.775 | 0.439 |
| **Adaptability** | CEDAR | 3 | 3.0 | 4.0 | 3.7 | 0.577 | Interviews vs. Literature | 60.500 | 0.696 | 0.486 |
| | GI | 8 | 3.0 | 4.0 | 3.6 | 0.518 | GI vs. CEDAR | 11.500 | -0.122 | 0.903 |
| | Literature | 13 | 3.0 | 5.0 | 3.9 | 0.768 | GI Vs. Literature | 43.500 | -0.666 | 0.505 |
| | **Overall** | **24** | **3.0** | **5.0** | **3.8** | **0.659** | CEDAR vs. Literature | 17.000 | -0.358 | 0.720 |

| Subcategory | Group | N | Min | Max | Avg. Median | Std. Dev. | Results | U | Z | Sig. 2-tailed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Keep efforts focused - set goals first** | CEDAR | 2 | 3.0 | 4.0 | 3.5 | 0.707 | Interviews vs. Literature | 5.500 | -0.178 | 0.859 |
| | GI | 4 | 1.5 | 5.0 | 3.6 | 1.493 | GI vs. CEDAR | 3.000 | -0.492 | 0.623 |
| | Literature | 2 | 3.5 | 4.0 | 3.8 | 0.354 | GI Vs. Literature | 3.000 | -0.492 | 0.623 |
| | **Overall** | **8** | **1.5** | **5.0** | **3.6** | **1.026** | CEDAR vs. Literature | 1.500 | -0.408 | 0.683 |
| **Perseverance** | CEDAR | 2 | 3.0 | 4.0 | 3.5 | 0.707 | Interviews vs. Literature | 4.500 | -0.203 | 0.839 |
| | GI | 3 | 3.0 | 5.0 | 4.2 | 1.048 | GI vs. CEDAR | 1.500 | -0.889 | 0.374 |
| | Literature | 2 | 3.0 | 5.0 | 4.0 | 1.414 | GI Vs. Literature | 3.000 | 0.000 | 1.000 |
| | **Overall** | **7** | **3.0** | **5.0** | **3.9** | **0.932** | CEDAR vs. Literature | 1.500 | -0.408 | 0.683 |
| **Planner's Role** | CEDAR | 4 | 2.0 | 4.0 | 3.0 | 0.817 | Interviews vs. Literature | 21.000 | -1.686 | 0.092 |
| | GI | 9 | 1.0 | 4.5 | 3.5 | 1.061 | GI vs. CEDAR | 10.500 | -1.236 | 0.216 |
| | Literature | 6 | 3.0 | 5.0 | 4.2 | 0.753 | GI Vs. Literature | 17.500 | -1.221 | 0.222 |
| | **Overall** | **19** | **1.0** | **5.0** | **3.6** | **0.980** | CEDAR vs. Literature | 3.500 | -1.901 | 0.057 |
| **Priority and Decision Making Process** | CEDAR | 5 | 3.0 | 4.0 | 3.2 | 0.447 | Interviews vs. Literature | 98.000 | -1.185 | 0.236 |
| | GI | 9 | 3.0 | 4.0 | 3.6 | 0.527 | GI vs. CEDAR | 14.500 | -1.241 | 0.215 |
| | Literature | 18 | 2.0 | 5.0 | 3.2 | 0.804 | GI Vs. Literature | 55.000 | -1.457 | 0.145 |
| | **Overall** | **32** | **2.0** | **5.0** | **3.3** | **0.695** | CEDAR vs. Literature | 43.000 | -0.170 | 0.865 |

| Subcategory | Group | N | Min | Max | Avg. Median | Std. Dev. | Results | U | Z | Sig. 2-tailed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Systems Thinking** | CEDAR | 5 | 3.0 | 5.0 | 3.6 | 0.894 | Interviews vs. Literature | 119.000 | -0.541 | 0.589 |
| | GI | 9 | 3.0 | 4.5 | 3.7 | 0.559 | GI vs. CEDAR | 19.500 | -0.427 | 0.670 |
| | Literature | 19 | 2.5 | 5.0 | 3.8 | 0.770 | GI Vs. Literature | 78.500 | -0.366 | 0.715 |
| | **Overall** | **33** | **2.5** | **5.0** | **3.7** | **0.719** | CEDAR vs. Literature | 40.500 | -0.527 | 0.598 |
| **Changing landscapes - human and ecological** | CEDAR | 4 | 1.5 | 4.0 | 2.6 | 1.108 | Interviews vs. Literature | 81.000 | -0.792 | 0.428 |
| | GI | 5 | 1.0 | 5.0 | 3.0 | 1.418 | GI vs. CEDAR | 9.000 | -0.249 | 0.803 |
| | Literature | 22 | 1.0 | 5.0 | 3.1 | 1.007 | GI Vs. Literature | 47.500 | -0.473 | 0.636 |
| | **Overall** | **31** | **1.0** | **5.0** | **3.0** | **1.060** | CEDAR vs. Literature | 33.500 | -0.753 | 0.451 |
| **Paradigm Shifts** | CEDAR | N/A | N/A | N/A | N/A | N/A | Interviews vs. Literature | 29.500 | -0.337 | 0.736 |
| | GI | 5 | 3.5 | 4.0 | 3.8 | 0.236 | GI vs. CEDAR | N/A | N/A | N/A |
| | Literature | 13 | 3.0 | 4.0 | 3.7 | 0.412 | GI Vs. Literature | 29.500 | -1.007 | 0.314 |
| | **Overall** | **18** | **3.0** | **4.0** | **3.7** | **0.387** | CEDAR vs. Literature | N/A | N/A | N/A |
| **Humans and Landscape** | CEDAR | 2 | 2.0 | 3.0 | 2.5 | 0.707 | Interviews vs. Literature | 51.500 | -0.866 | 0.386 |
| | GI | 3 | 2.0 | 4.0 | 3.0 | 1.000 | GI vs. CEDAR | 2.000 | -0.609 | 0.543 |
| | Literature | 27 | 1.0 | 4.0 | 2.5 | 0.784 | GI Vs. Literature | 26.500 | -1.007 | 0.314 |
| | **Overall** | 32 | 1.0 | 4.0 | 2.5 | **0.788** | CEDAR vs. Literature | 25.000 | -0.180 | 0.857 |

| Subcategory | Group | N | Min | Max | Avg. Median | Std. Dev. | Results | U | Z | Sig. 2-tailed |
|---|---|---|---|---|---|---|---|---|---|---|
| **Humans and Society*** | CEDAR | 2 | 1.0 | 2.0 | 1.5 | 0.707 | Interviews vs. Literature | 44.000 | -2.186 | ***0.029*** |
| | GI | 4 | 1.0 | 2.0 | 1.8 | 0.500 | GI vs. CEDAR | 3.000 | -0.559 | 0.576 |
| | Literature | 31 | 1.0 | 4.0 | 2.4 | 0.768 | GI Vs. Literature | 32.500 | -1.658 | 0.097 |
| | **Overall** | 37 | 1.0 | 4.0 | 2.3 | **0.778** | CEDAR vs. Literature | 11.500 | -1.577 | 0.115 |
| **Cultural Models and Individual Behaviors** | CEDAR | 5 | 1.5 | 3.0 | 2.0 | 0.612 | Interviews vs. Literature | 64.500 | -0.454 | 0.650 |
| | GI | 8 | 1.5 | 4.0 | 2.4 | 0.980 | GI vs. CEDAR | 14.000 | -0.963 | 0.336 |
| | Literature | 11 | 1.0 | 4.0 | 2.3 | 0.786 | GI Vs. Literature | 43.500 | -0.048 | 0.962 |
| | **Overall** | 24 | 1.0 | 4.0 | 2.3 | **0.807** | CEDAR vs. Literature | 20.000 | -0.940 | 0.347 |
| **Planning and Policies** | CEDAR | 4 | 1.0 | 2.0 | 1.6 | 0.479 | Interviews vs. Literature | 37.500 | -1.220 | 0.222 |
| | GI | 4 | 1.0 | 2.0 | 1.5 | 0.577 | GI vs. CEDAR | 7.000 | -0.316 | 0.752 |
| | Literature | 13 | 1.0 | 3.0 | 1.8 | 0.555 | GI Vs. Literature | 18.000 | -1.078 | 0.281 |
| | **Overall** | 21 | 1.0 | 3.0 | 1.7 | **0.539** | CEDAR vs. Literature | 19.500 | -0.868 | 0.385 |